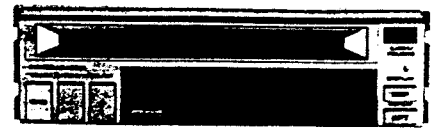
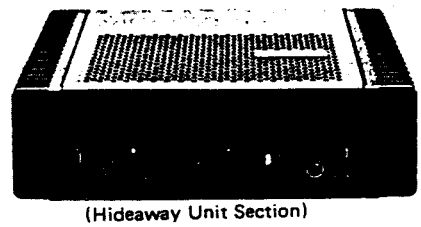
PIONEER

Service Manual

REPAIR & ADJUSTMENTS



(Player Section)



(Hideaway Unit Section)

ORDER NO.
CRT-483-0

COMPONENT CAR STEREO COMPACT DISC PLAYER

CDX-1 EW

COMPACT disc DIGITAL AUDIO

- For the circuit descriptions, please refer to the CDX-1 service manual (CRT-487-0).

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SPECIFICATIONS

General

System ..... Motor vehicle compact disc digital audio system
Disc ..... Diameter: 120mm
Thickness: 1.2mm
Maximum playing time: Over 60 minutes (stereo)
Linear velocity: 1.2~1.4m/sec.
Rotation direction: Counterclockwise
Signal format ..... Sampling frequency: 44.1kHz
Number of quantization bits: 16; linear
Transmission bit rate: 4.3218Mbit/sec.
Modulation system: EFM
Error correction system: CIRC
Pre-emphasis: 50/15μsec.
Laser ..... Semiconductor laser: wavelength 780nm
Power requirements ..... 14.4V DC (10.8~15.6V possible)
Power consumption 18W
Weight ..... Player section: 2.1 kg
Hideaway unit section : 1.7kg
Dimensions ..... Player section: 180(W)x50(H)x165(D) mm
Hideaway unit section: 180(W)x50(H)x165(D) mm

Audio

Frequency characteristics ..... 5~20,000Hz (±1 dB)
Signal-to-noise ratio ..... 90 dB (1kHz) (IEC-A network)
Dynamic range ..... 90 dB (1kHz)
Wow and flutter ..... Below measurement range
Distortion factor ..... Below 0.005% (1kHz, 0 dB)
Output voltage .... 280mV (1kHz, 0 dB) (when level switching High)
140mV (1kHz, 0 dB) (when level switching Low)
Number of channels ..... 2 (stereo)

Note:
Specifications and the design are subject to possible modification without notice due to improvements.

Noncontact Optical Pickup

A slight laser beam generated by the optical pickup strikes the signal surface of the disc. The reflected beam is then sent to a photodiode which reads the digital signals picked up from the disc. Since signals are read without contacting the surface of the medium, needle generated friction as in conventional phonograph systems and the accompanying hiss are eliminated. Also, since the disc itself is coated with clear plastic, the signal surface is protected from the effects of dust, finger smudges and dirt.

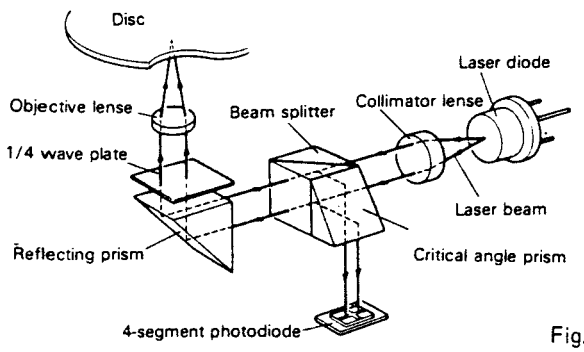


Fig. 1

Pickup Block Diagram

1. SAFETY INFOMATION

1. Safety Precautions for those who Service this Unit.

• Follow the adjustment steps (see pages 28 through 35) in the service manual when servicing this unit. Whe checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.

Caution:

1. During repair or tests, minimum distance of 13cm from the focus lens must be kept.
2. During repair or tests, do not view laser beam for 10 seconds or longer.

2. A "CLASS 1 LASER PRODUCT" label is affixed to the bottom of the player. (Fig. 2-1, 2)

• Two screws are affixed to the bottom of the unit to secure the mechanism during transport. Be sure to remove these screws before installation of the player. (Fig. 2-2)

Fig. 2-1

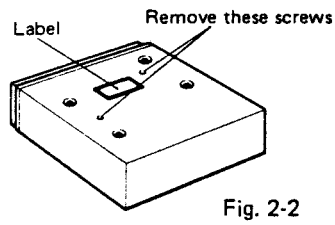


Fig. 2-2

3. The triangular label is attached to the mechanism unit plate unit (Fig. 3)

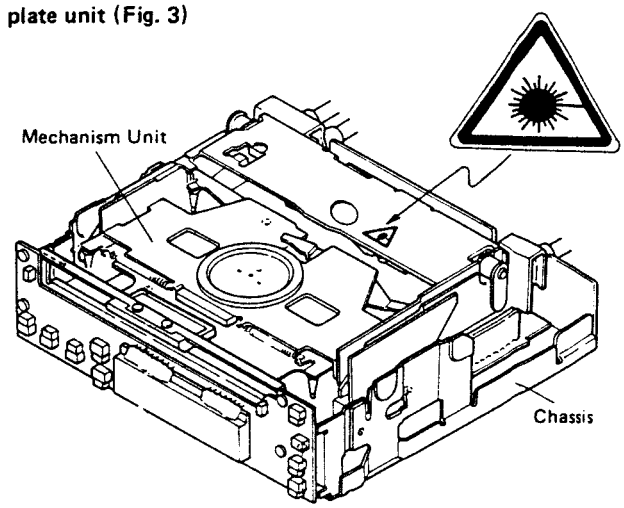


Fig. 3

2. PARTS LOCATION

NOTE

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ : GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

- Player Section

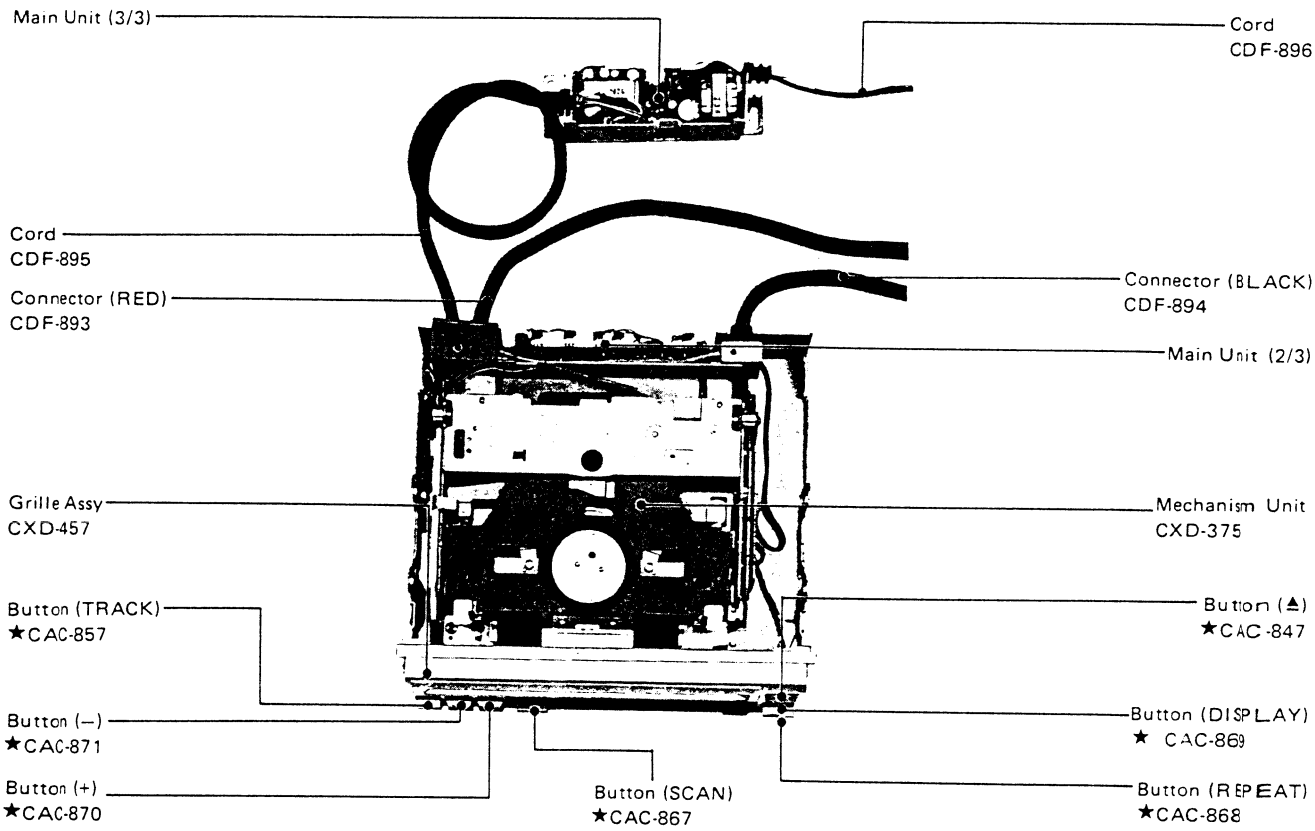


Fig. 4

- Hideaway Unit Section

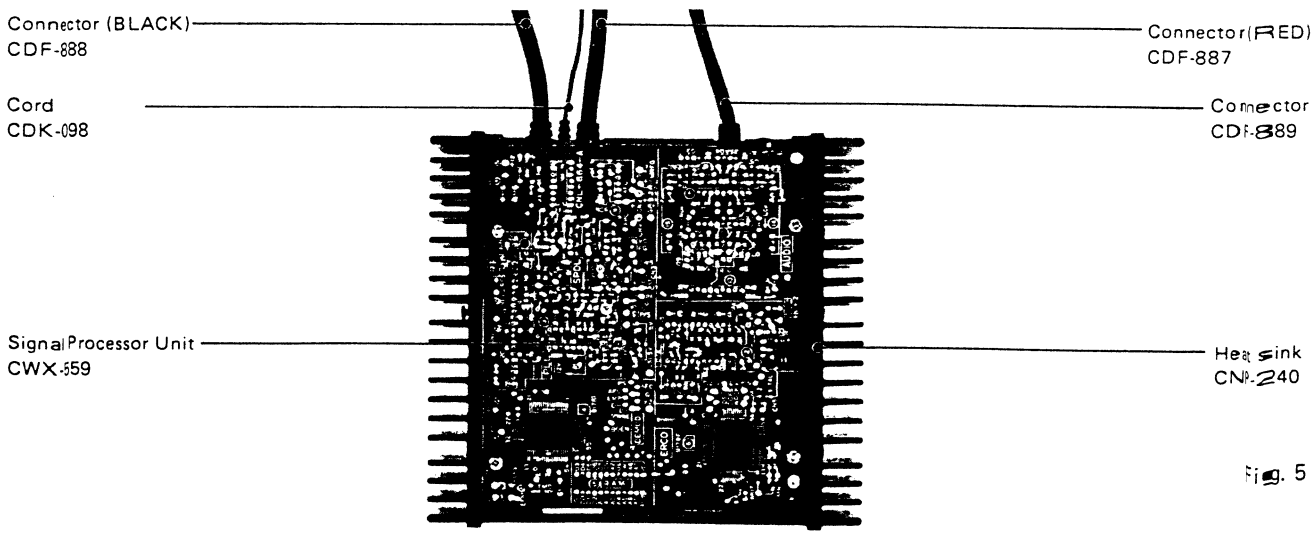


Fig. 5

3. NAME OF PARTS AND THEIR FUNCTIONS

3.1 Player Section

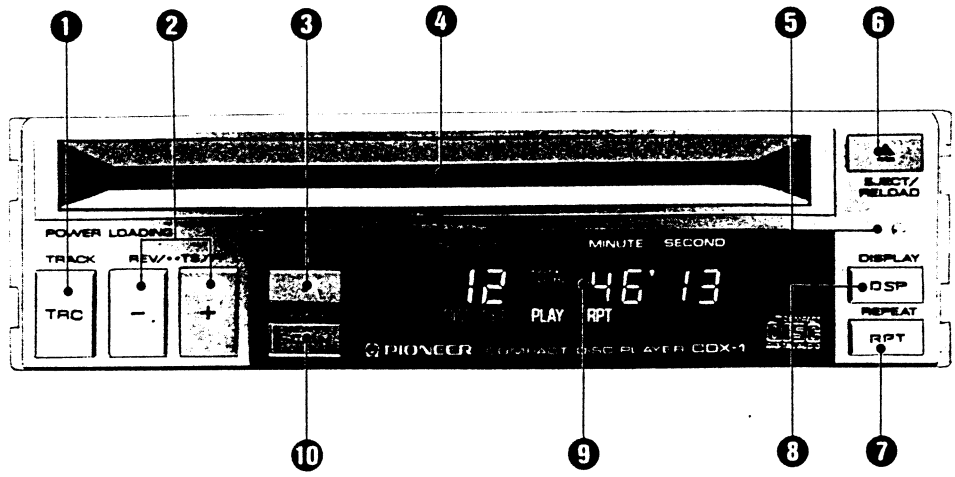


Fig. 6

❶ Track Number Search Button

Used to find the start point of a selection. Pressing this button once will increase the track number shown on the display by one, while holding it down will cause the track number to be continuously incremented at high speed.

❷ High Speed Forward (+)/High Speed Reverse (−) Buttons

Pressing the (+) button will advance the disc at high speed, while pressing the (−) button will enable high speed reverse. To perform track search, press either one of these buttons twice.

❸ Release/Pause Button

Press to cancel music scan, music repeat or either of the high speed functions during their respective operation. This button is also pressed to temporarily suspend disc play. Pressing again will restart disc play.

❹ Disc Insert Slot

With the side of the disc containing the label (with the names of the selections) facing up, start the disc into the insert slot. The auto loading mechanism will then take over to set the disc and begin play.

- When used in combination with a CENTRATE component car stereo cassette deck (FX-K9, etc.), the tape power switch and tuner power switch should both be set to the OFF position.
- When used in combination with a component car stereo cassette deck (KP-007, etc.), the cassette tape should be ejected.

❺ Clear Button

Should abnormalities occur during disc play (such as improper display), press this button with a thin pointed object. The unit will return to normal operations after a few seconds.

❻ Eject/Reload Button

Press to eject the disc during play, and press once again to reset.

❼ Music Repeat Button

Press to continually repeat the selection being played. This function is cancelled either by pressing again or by pressing the release button. When this function is not being used, the disc will continually play from beginning to end.

❽ Display Select Button

Switches the contents of the display from A to B to C with each respective press.

A: TOTAL and REMAIN disappear from the display and the track number being played together with the elapsed time of that selection will be shown.
B: TOTAL illuminates on the display and the total number of selections included on the disc together with the total play time of the disc will be shown.
C: REMAIN illuminates on the display and the number of selections remaining together with play time remaining will be shown.

❾ Display

❿ Music Scan Button

Press to sequentially search for the beginning of each selection and play the first ten seconds. When the selection being searched for is found, pressing the release button returns to normal play. Even if the unit is left in the scan function, normal play will be resumed when the beginning of the selection from which music scan was initiated is reached.

- Each control button features both an electronic beep signal and illuminated display to allow dual confirmation of proper operation.
- The level switch located on the back of the hideaway unit is usually kept in the H (high) position. Some cassette decks, may cause the distortion of high level signals, in the disc player. In this case, this switch should be set to the L (low) position. In this position the level is reduced 6 dB.

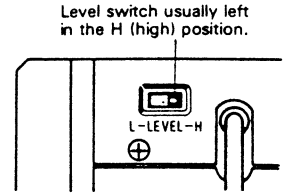


Fig. 7

Hideaway unit

3.2 Reading the Display

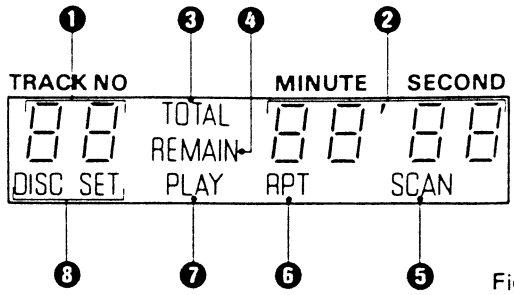


Fig. 8

❶❷ 88'88 : Track, Time Display

Each time the display select button is pressed the contents of the display are switched from A to B to C respectively.

A: When TOTAL ❸ and REMAIN ❹ disappear from the display, ❶ will show the track number being played and ❷ the elapsed time of that track.

B: When TOTAL ❸ illuminates on the display, ❶ will show the total number of selections included on the disc together and ❷ the total play time of the disc.

C: When REMAIN ❹ illuminates on the display, ❶ will show the number of selections remaining and ❷ the play time remaining.

❸ TOTAL : Total Display

The display select button is pressed until this indicator illuminates on the display. The total number of selections included on the disc is indicated by ❶ and the total play time of the disc is indicated by ❷.

❹ REMAIN : Remain Display

The display select button is pressed until this indicator illuminates on the display. The number of selections remaining is indicated by ❶ and the play time remaining is indicated by ❷.

❺ SCAN : Music Scan Display

Illuminates when the scan button is pressed to indicate that the scan function is operational.

❻ RPT : Music Repeat Display

Illuminates when the music repeat button is pressed to indicate that the repeat function is operational.

❼ PLAY : Play Display

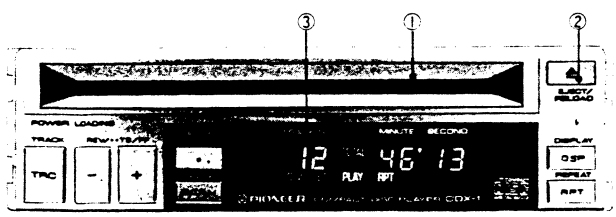
Illuminates while the disc is playing. If the pause button is pressed, the PLAY display flashes and disc play is suspended.

❽ DISC SET : Disc Set Display

Illuminates when the disc is set in the player.

- To protect the semiconductor laser from damage, this unit contains a feature which automatically stops disc play when the ambient temperature rises past a certain level. When this occurs, ❶ and ❷ will show HHHHHH. Eject the disc from the unit using the eject button and wait until the temperature returns to normal.
- When a space of a few seconds exists between the selections of the disc being used, ❷ will show -'02, -'01 when the spaces are passed.

3.3 Operation



Player Section

Fig. 9

- When used in combination with a CENTRATE component car stereo cassette deck (FX-K9, etc.), the tape power switch and tuner power switch should both be set to the OFF position.
- When used in combination with a component car stereo cassette deck (KP-007, etc.), the cassette tape should be ejected.

1. With the side of the disc with the label (with the names of the selections) facing up, start the disc into the insert slot ❶. The auto loading mechanism will then take over to set the disc and begin play.
2. Adjust the volume, balance, bass and treble to the desired settings using the control of the cassette deck.
3. To stop disc play or to change discs, press the eject/reload button ❼. Pressing again will start play from the first selection of the disc in the unit.

- A cassette tape can be played and the tuner can be used for radio reception even while a disc is set in the player.
- Illumination of DISC SET on the display ❽ indicates that a disc is set in the unit. Note that attempting to insert another disc in this condition can cause damage to the discs and/or mechanical failure.
- Never attempt to stack two discs together and insert them in to the unit at the same time. This can cause mechanical failure of the unit.

• Track Number Search

This operation is convenient for skipping past a number of tracks to a specific selection.

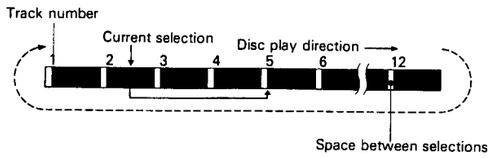


Fig. 10

Moving from Play in Selection 2 to Selection 5

Press the track number search button until the display shows track number 5.

• Music Scan

This operation allows a quick review of the selections on the disc. The beginning of each selection is sequentially located and played for 10 seconds before moving to the next selection.
Once the beginning of all the selections on the disc have been played and the selection from which this operation was initiated is returned to, music scan is released and normal disc play resumes.

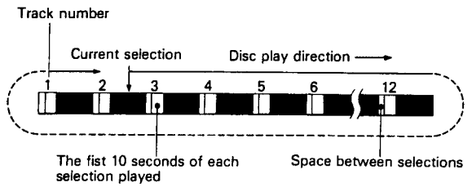


Fig. 11

Moving from Play in Selection 2 to Search for Another Selection

1. Press the music scan button (SCAN illuminates on the display).
2. When the beginning of the desired selection is playing, press the release button to cancel music scan and resume normal disc play.

- Music scan can be cancelled at any time during its operation by pressing the release button.

• Music Repeat

This operation can be used to replay a certain selection as many times as desired.

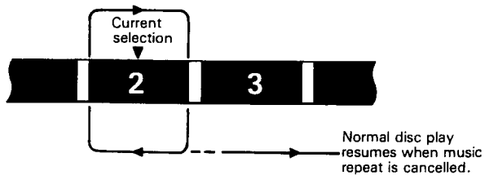


Fig. 12

Listening to Selection 2 Repeatedly

Press the music repeat button during play of selection 2 (RPT illuminates on the display). Selection 2 will then be repeated until music repeat is cancelled.

- Music repeat can be canceled at any time during its operation by pressing the release button or the music repeat button.
- When this function is not being used, the disc will continually play from beginning to end.

• Track Search

This operation is useful for returning to the beginning of the current selection or jumping to the beginning of the next selection.

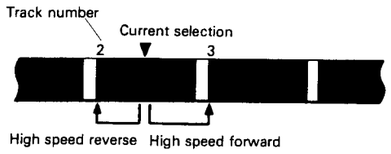


Fig. 13

Listening to Selection 2 One More Time

Press the high speed reverse button (−) twice. Play will automatically resume from the beginning of selection 2.

Skipping Over Selection 2 to Listen to Selection 3

Press the high speed forward button (+) twice. Play will automatically start from the beginning of selection 3.

4. CONNECTION

- Before making final connections, make temporary connections then operate the unit to check for any connecting cord problems.
- Connect the red and black connectors of the player to the respective red and black connectors of the hideaway unit, and securely tighten the retaining rings.
- Refer to the instruction manual for details on connecting the various cords of the deck and main amp then make connections correctly.
- Be sure to correctly connect the memory power supply lead (orange) and main power supply lead (red) as specified. If the connections are made incorrectly or forgotten, this unit will not work at all.
- Don't pass the memory power supply lead through a hole into the engine compartment to connect to the battery. This will damage the lead insulation and cause a very dangerous short.

Example wiring with CENTRATE component car stereo cassette deck (FX-K9, etc.)

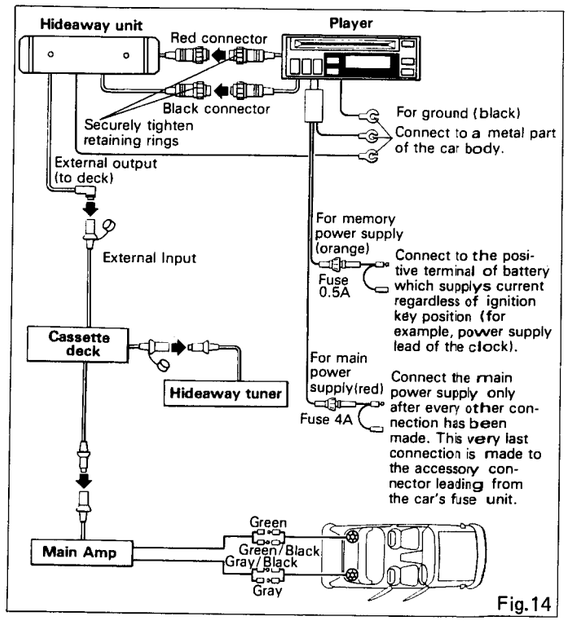

Hideaway unit
Player
Red connector
Black connector
Securely tighten retaining rings
For ground (black)
Connect to a metal part of the car body.
External output (to deck)
External Input
For memory power supply (orange)
Fuse 0.5A
Connect to the positive terminal of battery which supplys current regardless of ignition key position (for example, power supply lead of the clock).
Cassette deck
Hideaway tuner
For main power supply(red)
Fuse 4A
Connect the main power supply only after every other connection has been made. This very last connection is made to the accessory connector leading from the car's fuse unit.
Main Amp
Green
Green/Black
Gray/Black
Gray

Fig.14

Example wiring with component car stereo cassette deck (KP-007, etc.)

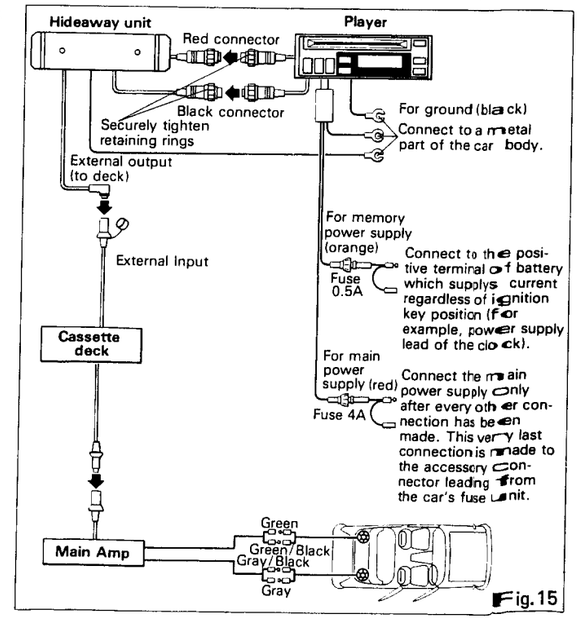

Hideaway unit
Player
Red connector
Black connector
Securely tighten retaining rings
For ground (black)
Connect to a metal part of the car body.
External output (to deck)
External Input
For memory power supply (orange)
Fuse 0.5A
Connect to the positive terminal of battery which supplys current regardless of ignition key position (for example, power supply lead of the clock).
Cassette deck
For main power supply (red)
Fuse 4A
Connect the main power supply only after every other connection has been made. This very last connection is made to the accessory connector leading from the car's fuse unit.
Main Amp
Green
Green/Black
Gray/Black
Gray

Fig.15

5. BLOCK DIAGRAM

- Player Section

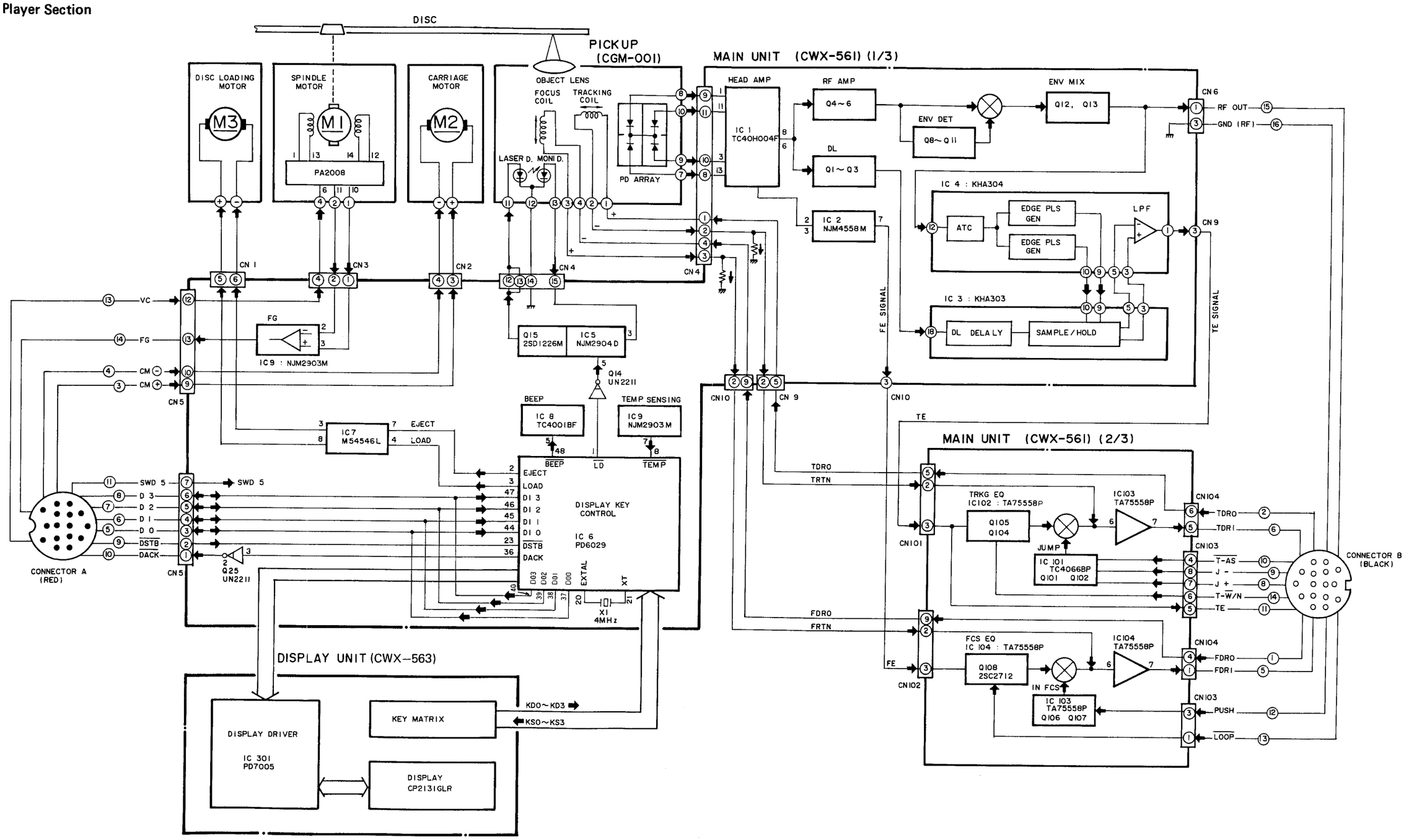


Fig. 16

- Hideaway Unit Section

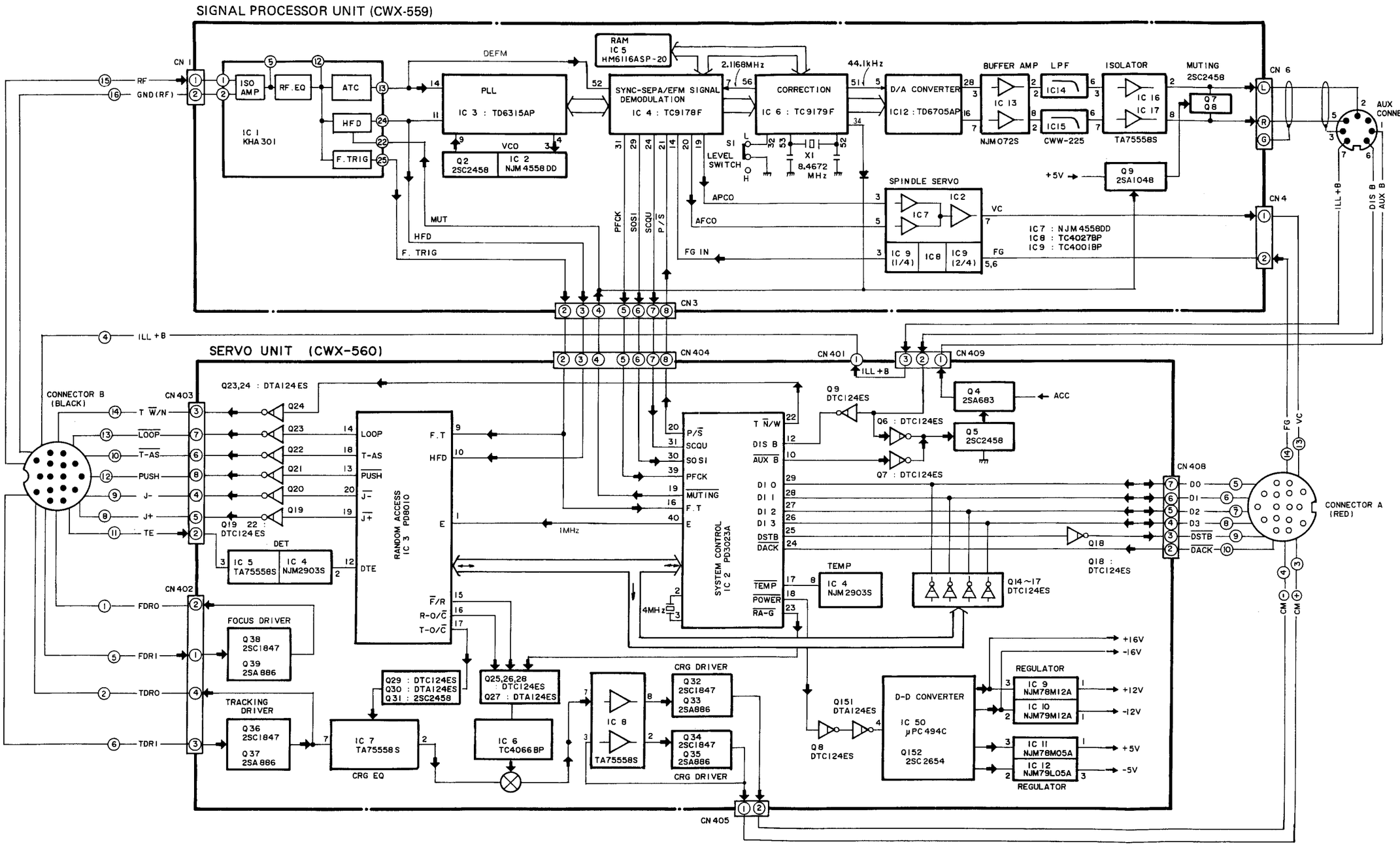


Fig. 17

5.1 POWER SUPPLY LINE

- **Player Section**

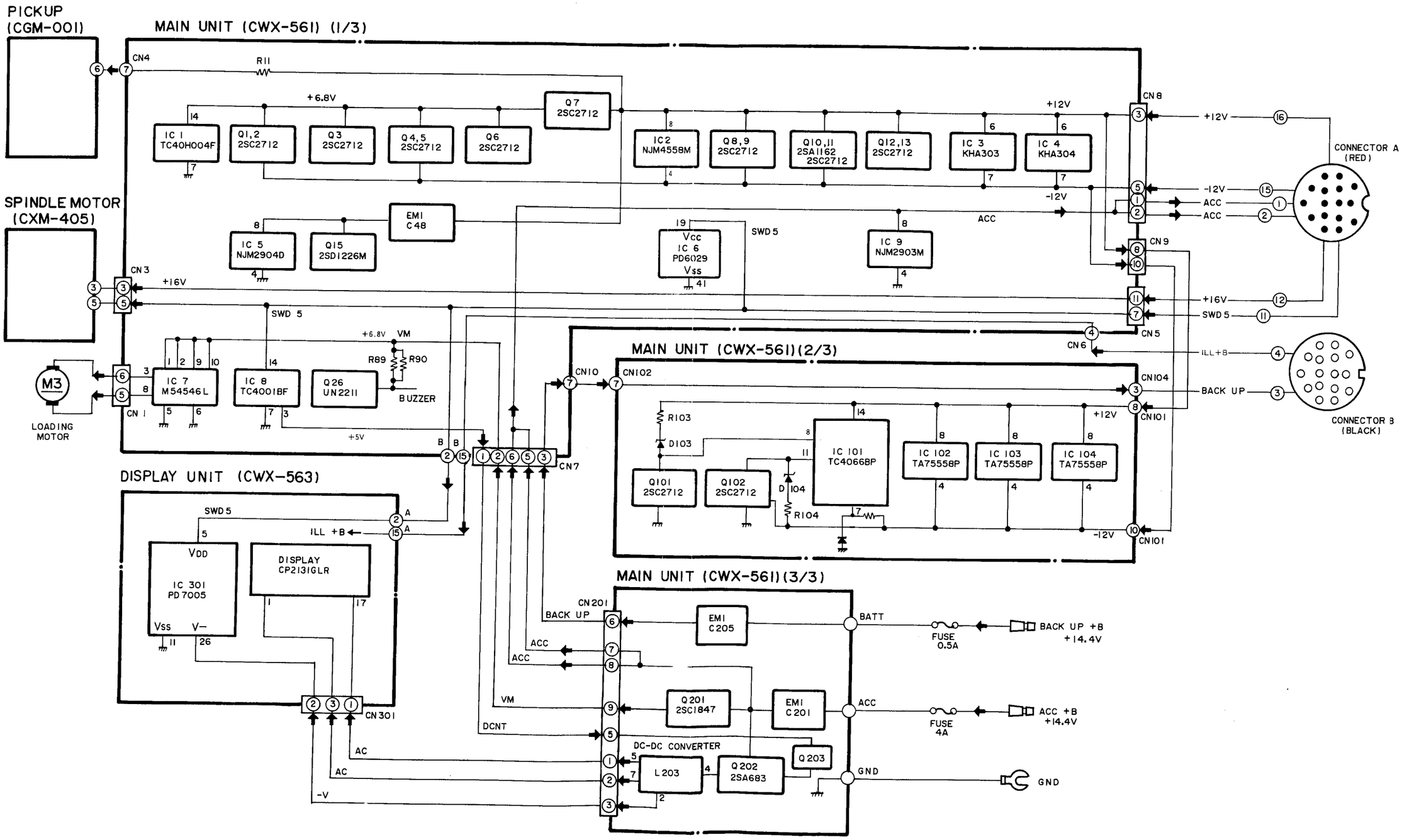


Fig. 1

- Hideaway Unit Section

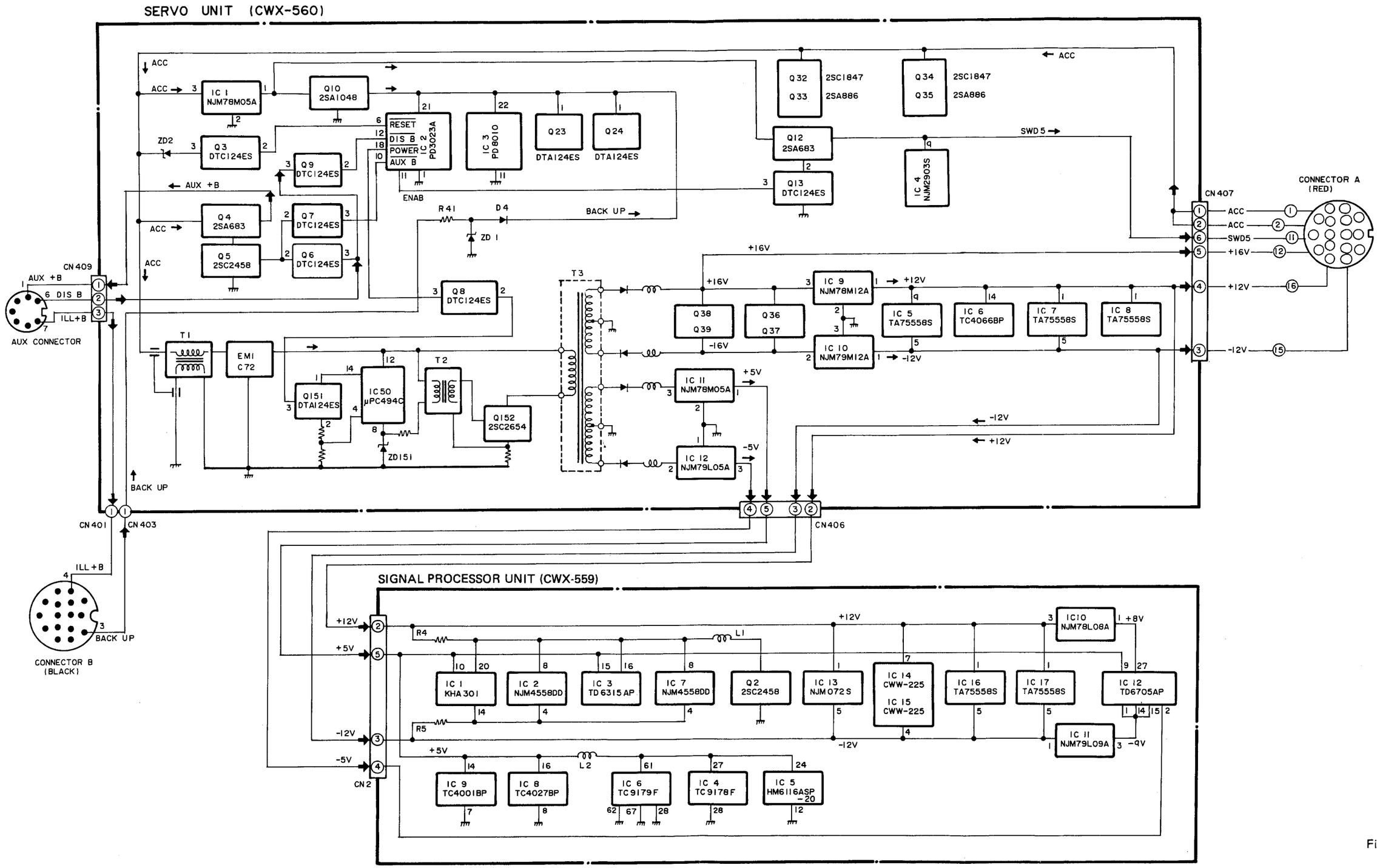


Fig. 19

6. DISASSEMBLY

6.1 HIDEAWAY UNIT SECTION

• Removing the Case

1. Remove the four screws (M3 x 8) labeled "A" which hold the case in place.

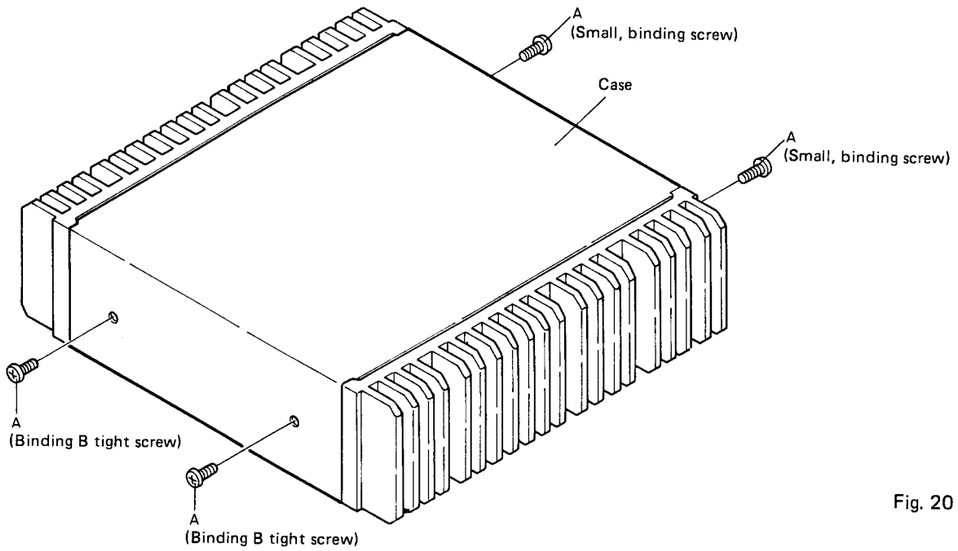


Fig. 20

• Removing the Chassis

1. Remove the two screws (M3 x 8) labeled "B."

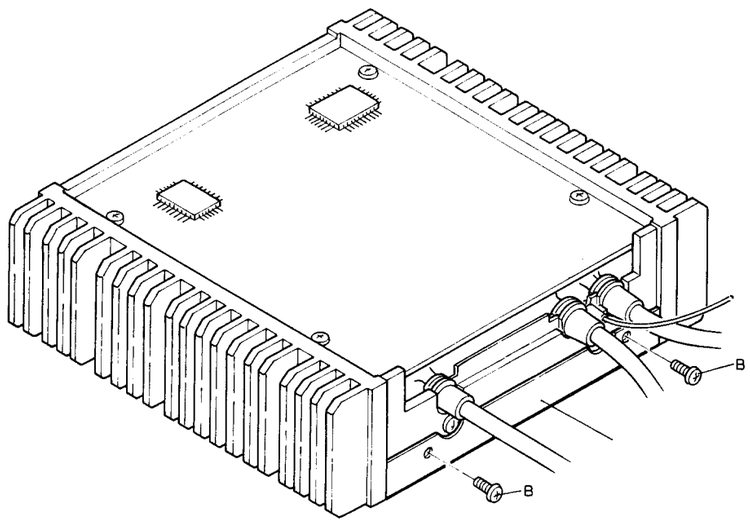


Fig. 21

• Removing the Signal Processor Unit

1. Remove the four screws (M3 x 6) labeled "C."
2. Remove the connectors (8P, 3P, 2P x 2, and 6P).

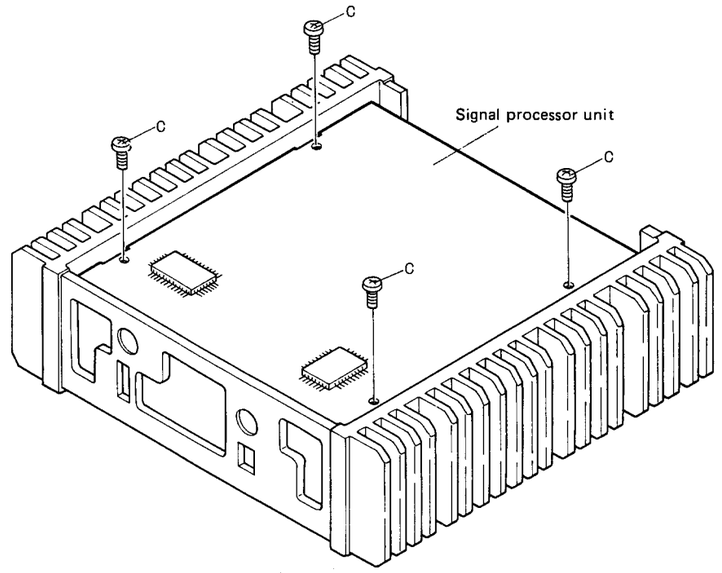


Fig. 22

• Removing the Servo Unit

1. Remove the ten screws labeled "D" (M3 x 10), "E" (M3 x 8), and "F" (M3 x 6).
2. The unit will lift out in the direction indicated by the arrow.

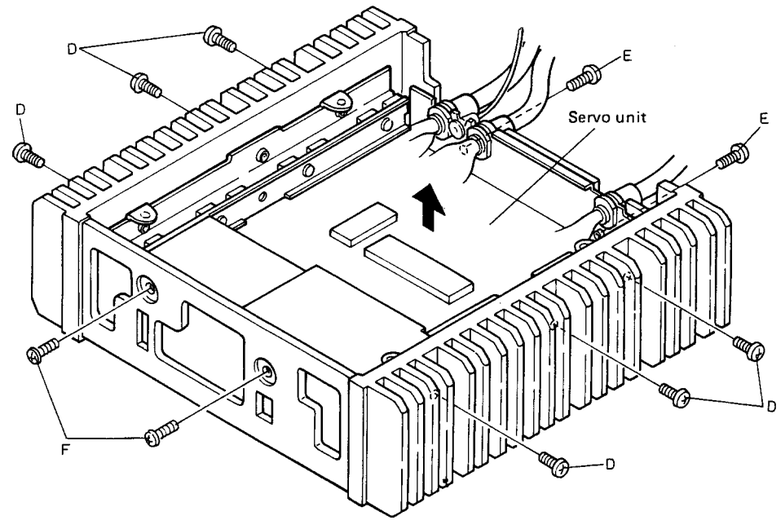


Fig. 23

6.2 PLAYER SECTION

- **Removing the Case**

1. Remove the six screws (M3 x 4) labeled "G" which hold the case in place.

- **Removing the Grille Assy**

1. Remove the two screws (M3 x 5) labeled "H."

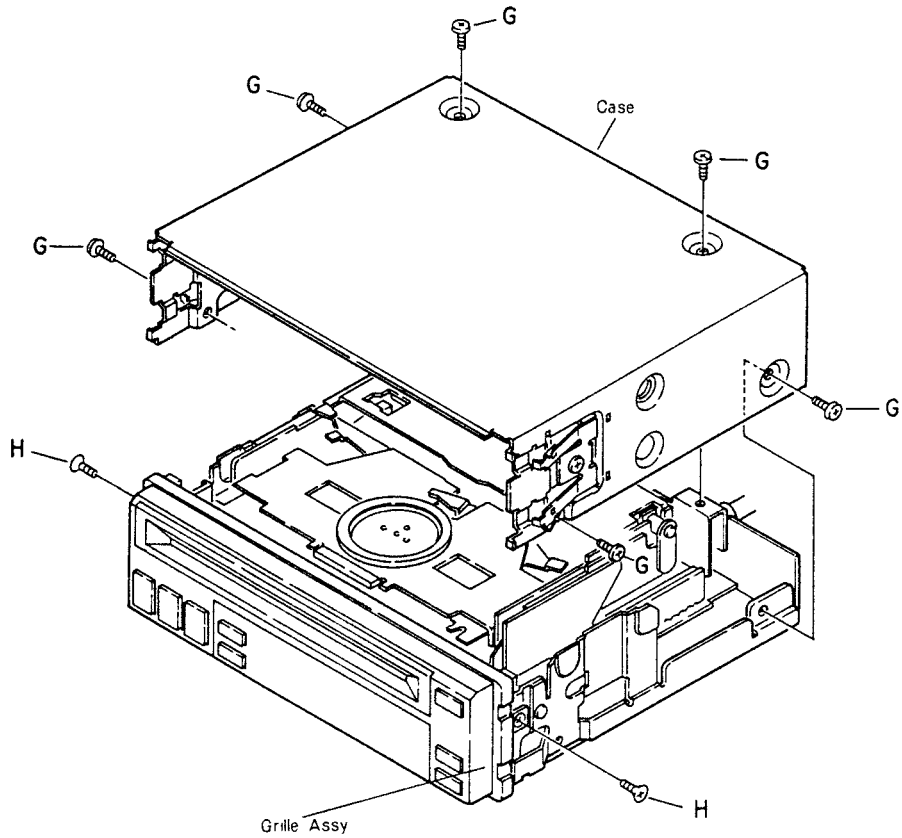


Fig. 24

- **Removing the Chassis**

1. Remove the four screws (M2.6 x 4) labeled "K."

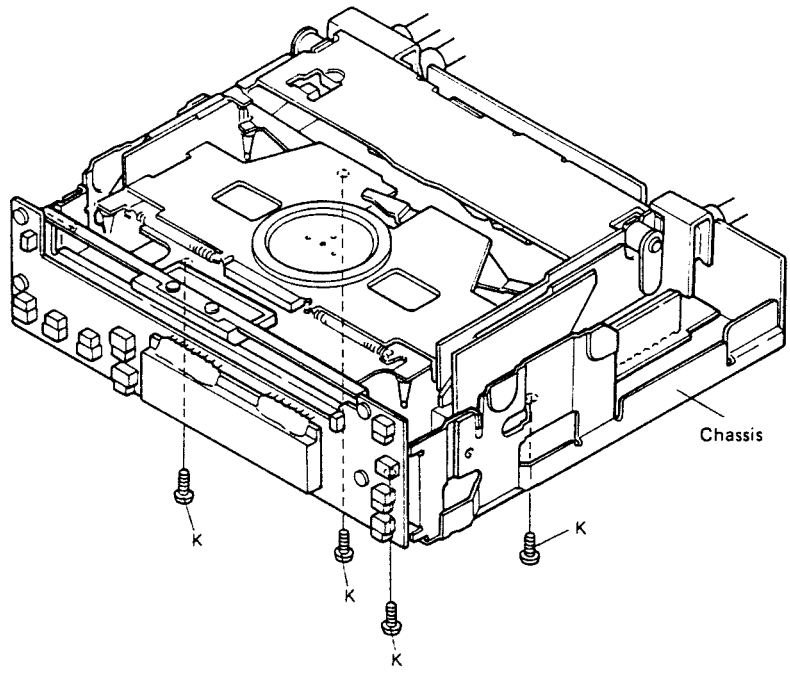


Fig. 25

- **Removing the Display Unit**

1. Remove the five screw (M2.6 x 4) labeled "L."
2. Disconnect the 3P connector.
3. Unsolder the 15 solder joints of the P. C. Board.

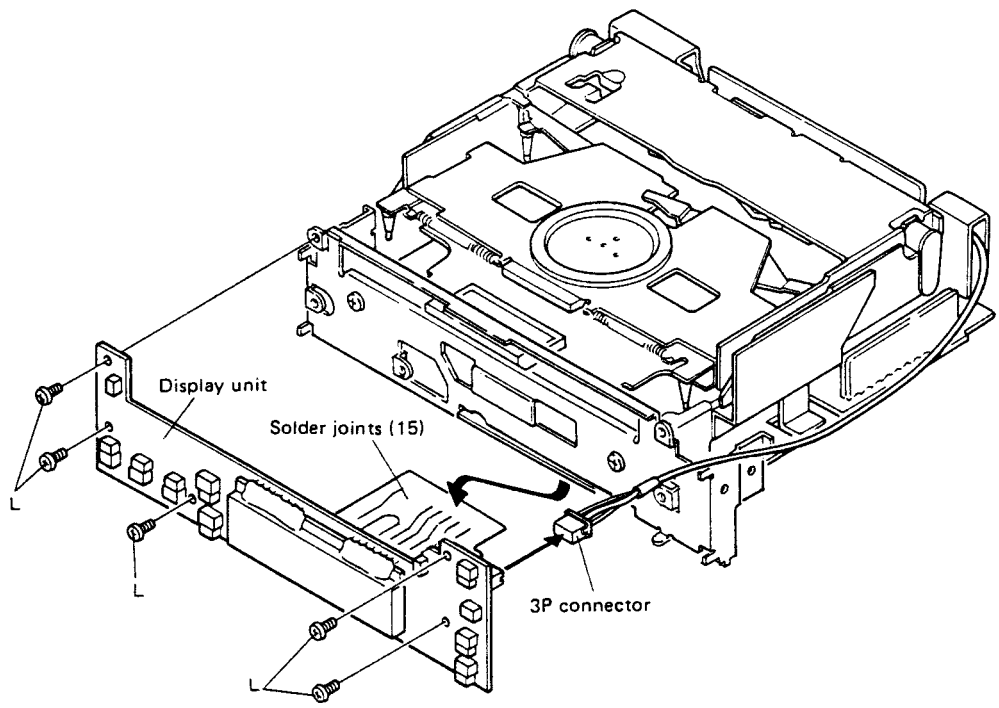


Fig. 26

• Removing the Main Unit (2/3)

1. Remove the screw (M2.6 x 4) labeled "N."
2. The unit will lift out if the catch is pulled out while lifting in the direction indicated by the arrow.

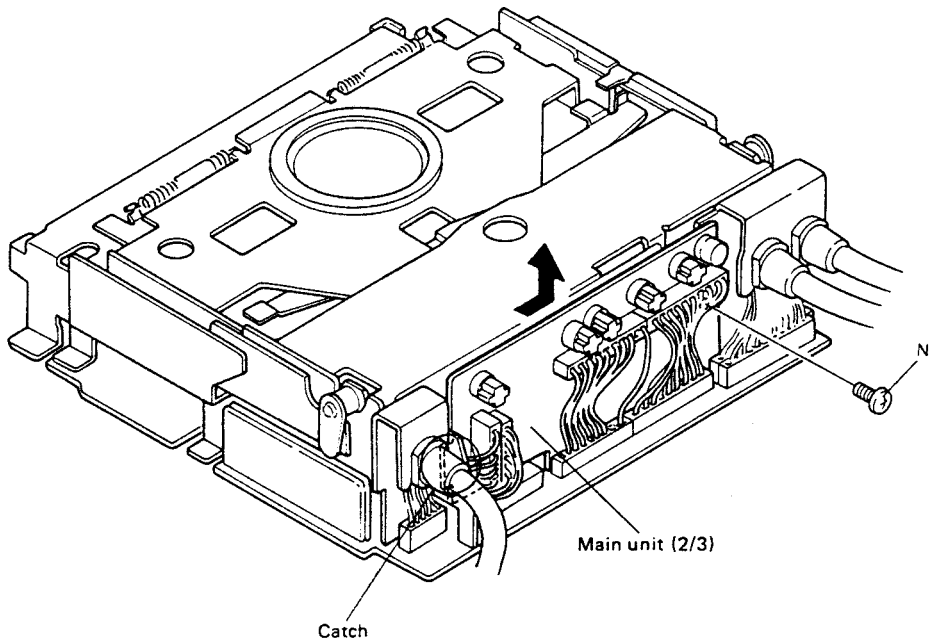


Fig. 27

• Removing the Main Unit (1/3) and Mechanism Assembly

1. Remove the four screws (M2.6 x 4) labeled "0."
2. The mechanism assembly may be removed by removing the connectors (4P, 6P x 2).

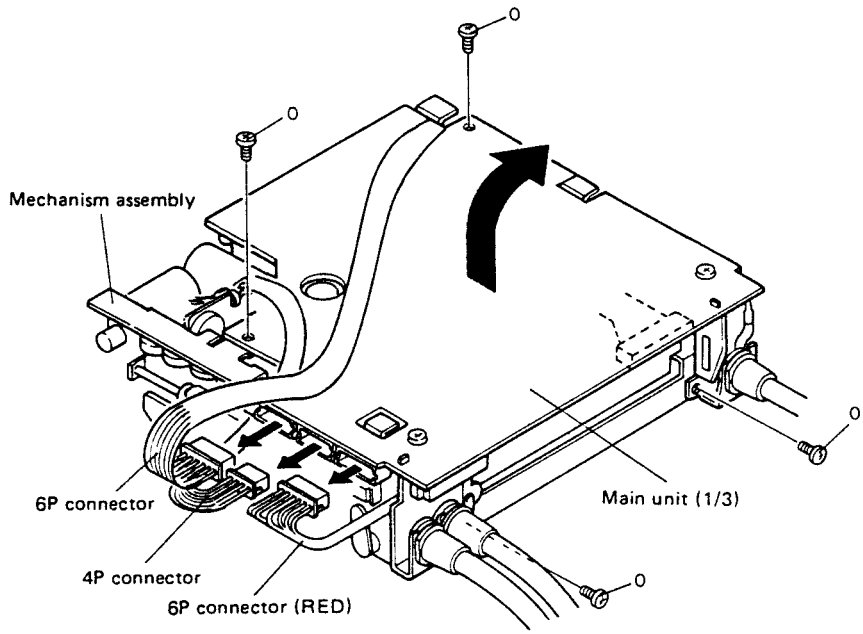


Fig. 28

• Removing the P.C. Board

1. Insert a flathead screwdriver and turn it in the direction indicated by the arrow. The two connector clips will release, and the P.C. Board can be removed.

Note: When removing the P.C. Board from the main unit, be sure to do so after shorting the pickup (P.C. Board pattern) with a short pin as shown in Fig. 32.

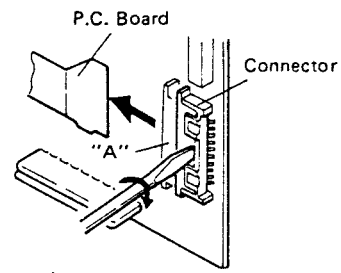


Fig. 29

• P.C. Board Attachment

1. Pressing the P.C. Board into place and pushing on "A" attaches the P.C. Board.

• Removing the Pickup

1. Turn the pulley in the direction indicated by the arrow until the pickup is in the removable position.
2. Remove the two screws (M3 x 4, M3 x 5) labeled "P."
3. Remove in the direction indicated by the arrow.

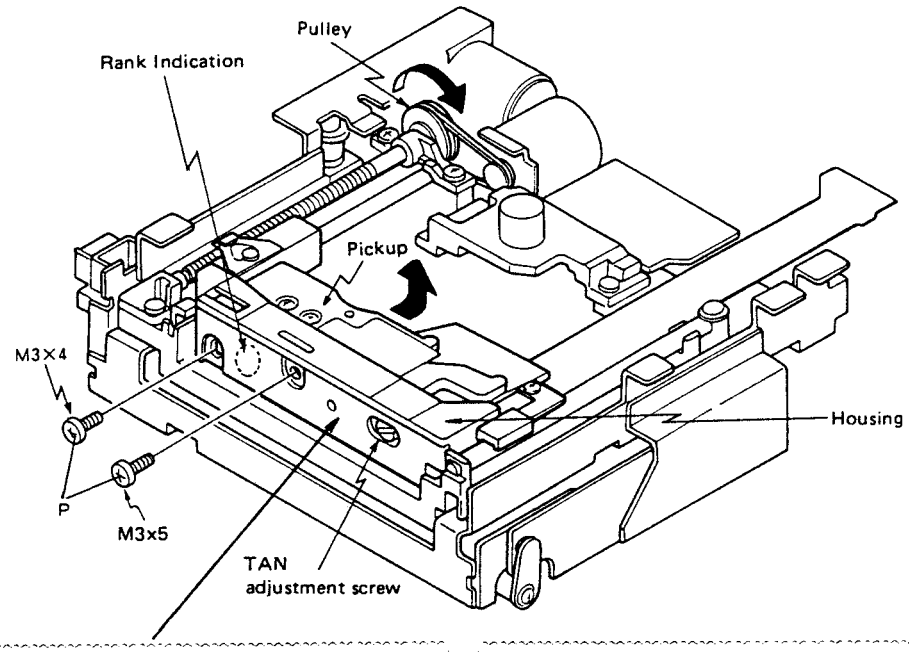


Fig. 30

Note: Be sure to attach the pickup so that it is parallel, by loosening the screw labeled "P" as shown in Fig. 31. This adjustment is the tangential direction incline adjustment shown on page 30 step 6. The adjustment is made by turning the TAN adjustment screw.

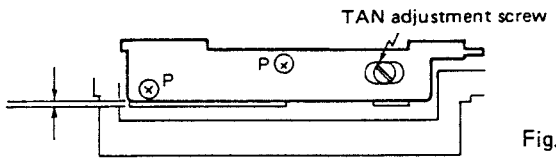


Fig. 31

Note: When removing the pickup be sure to short the pattern space with either a short pin or a jumper. Don't remove the short pin until after attaching the pickup and then attaching the P.C. Board (Fig. 29) to the main unit (1/3).

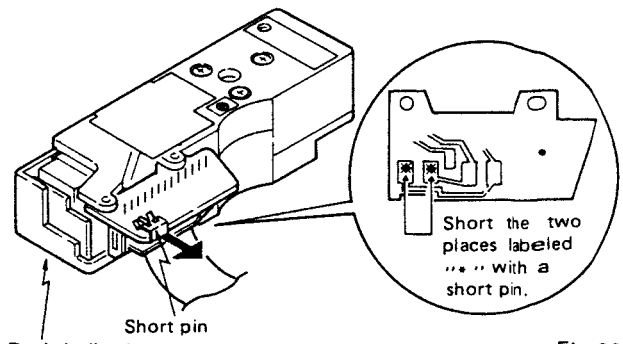


Fig. 32

Note:

- Mechanism unit and pickup combinations (Refer to Fig. 30 and 32 concerning ranks.)

Mechanism unit \ Pickup	Rank A	Rank B	Rank C
Rank A	○	×	○
Rank B	×	○	○
Rank C	○	○	○

C: rank center

*Rank C parts are supplied as service parts.

6.3 MECHANISM UNIT

• Removing the Frame

1. Remove the two screws (M2.6 x 4) labeled "R."

• Removing the Plate

1. Remove the screw (M2 x 4) labeled "S," and the arm units "A" and "B."
2. Remove the screw (M2.6 x 3) labeled "T," the bracket, and the lever.
3. Remove the two screws (M2.6 x 4) labeled "U" and the lever unit.
4. The plate unit can be removed by pulling in the direction indicated by the arrow.

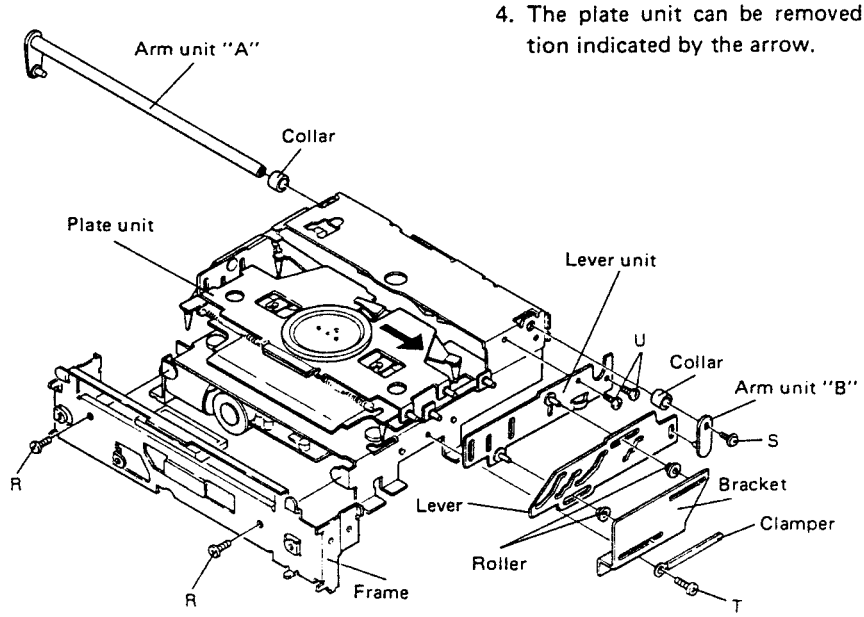


Fig. 33

• Removing the Plate Unit

1. Remove the two screws (M2 x 3) labeled "V" and the screw (M2.6 x 4) labeled "W."
2. It can be removed by pulling in the direction indicated by the arrow.

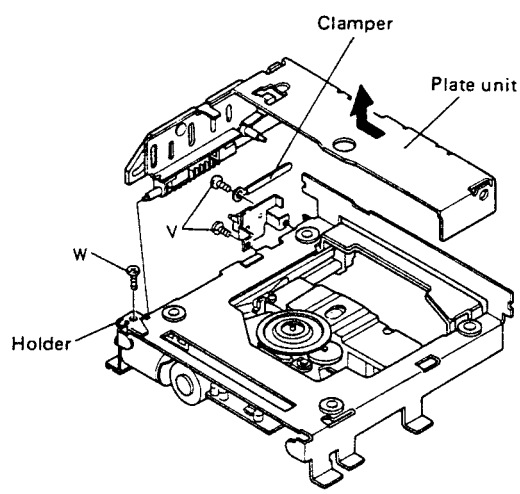


Fig. 34

• Removing the Spindle Motor

1. Remove the two screws (M2.6 x 6) labeled "X."
2. Slide the pulley in the direction indicated by the arrow and remove the spindle.

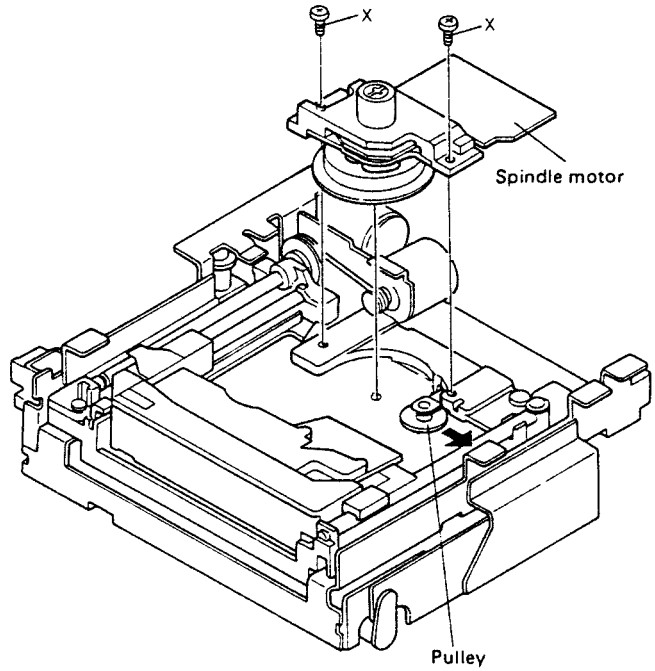


Fig. 35

NOTE: Take care not to let the spindle motor fly wheel shaft become scratched or dirty.

• Removing the Carriage Motor

1. Remove the two screws (M2.6 x 4) labeled "Y."
2. Remove the belt.

• Removing the Loading Motor

1. Remove the screw (M2.3 x 4) labeled "Z."

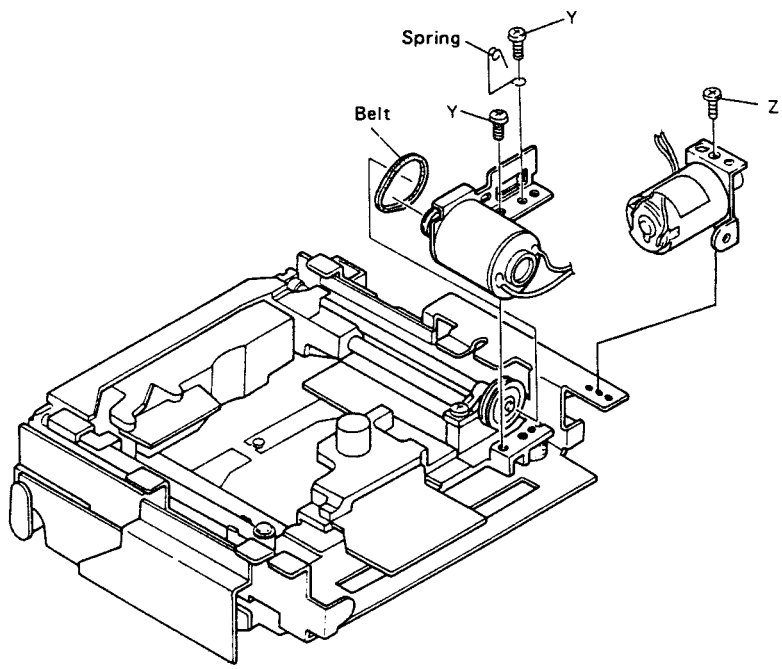
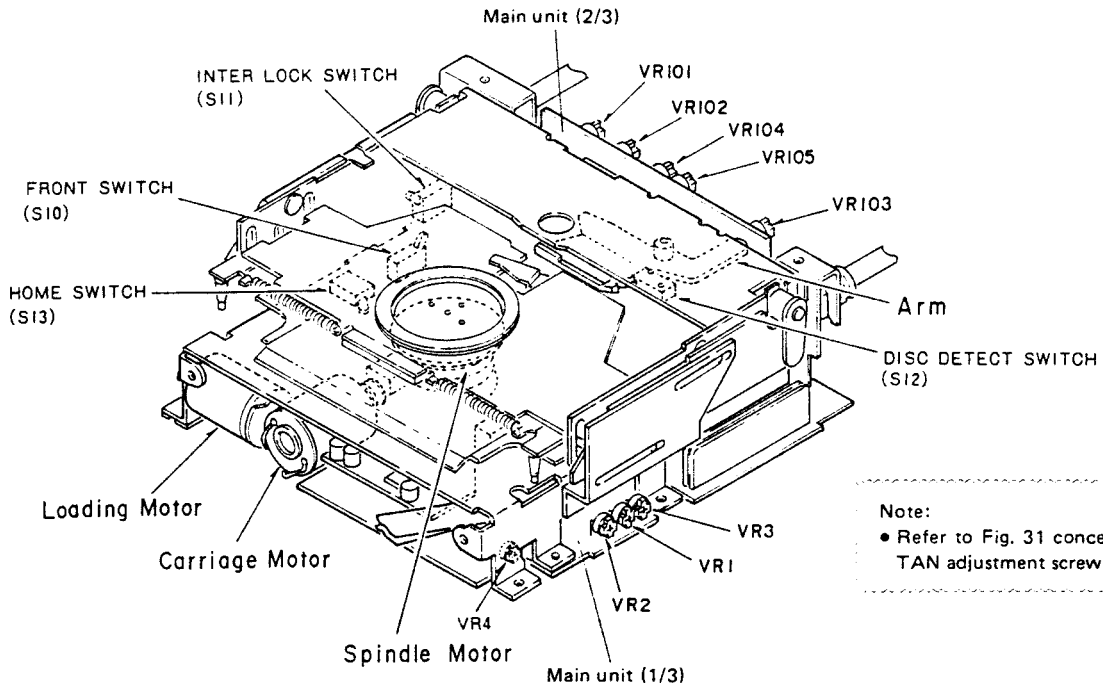


Fig. 36

7. ADJUSTMENTS

- Adjustment Points (Player Section)



Note:
- Refer to Fig. 31 concerning the TAN adjustment screw.

Fig. 37

- Main Unit (1/3) Pattern Diagram (Test Points)

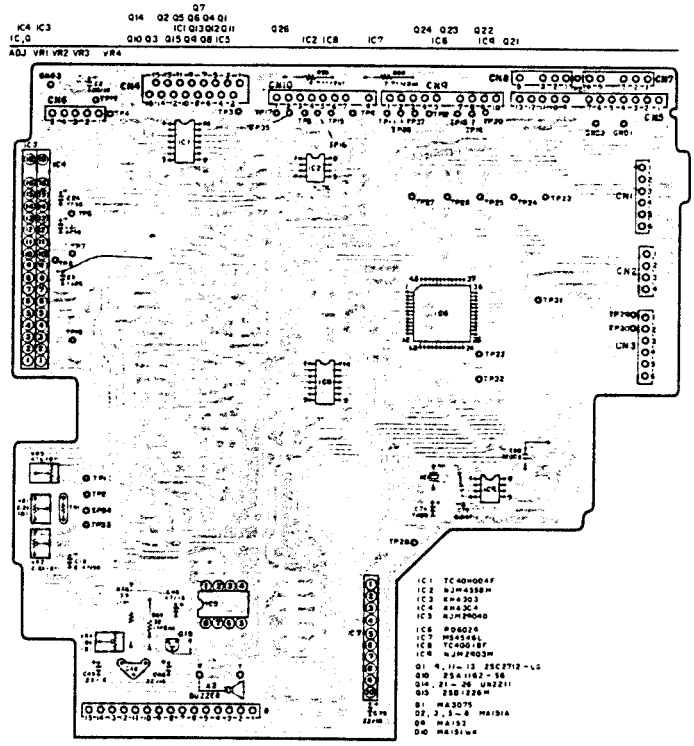


Fig. 38

• Adjustment Points (Hideaway Unit Section)

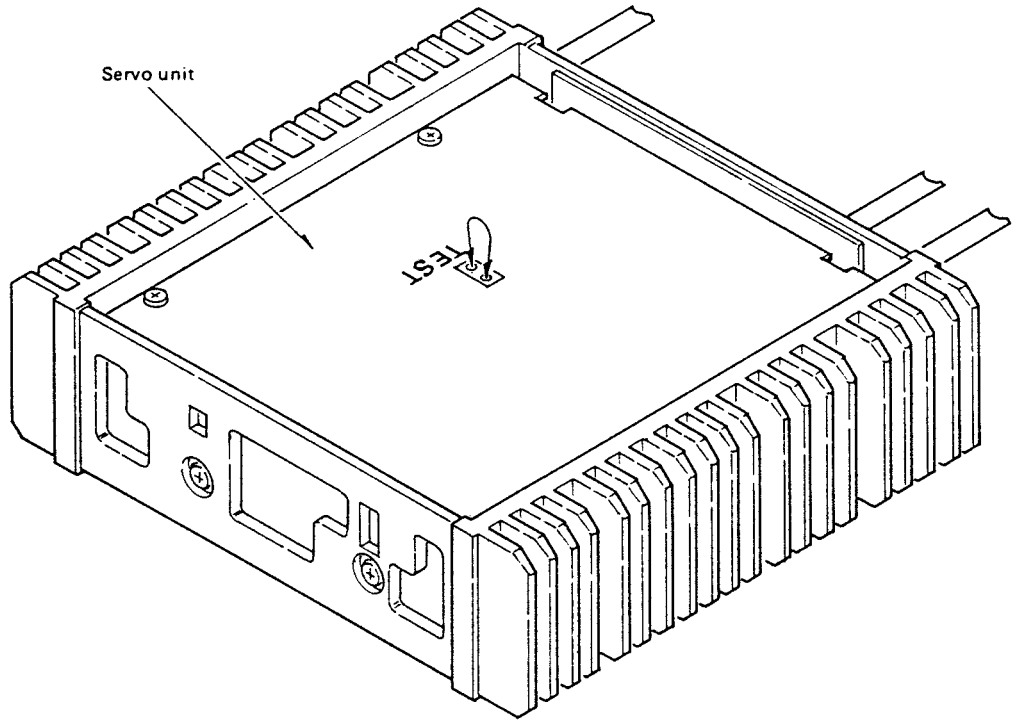


Fig. 39

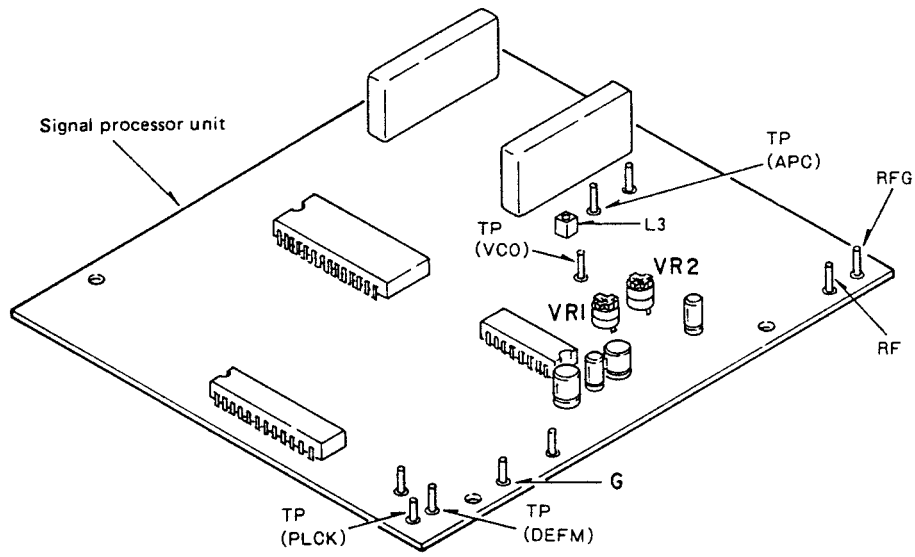
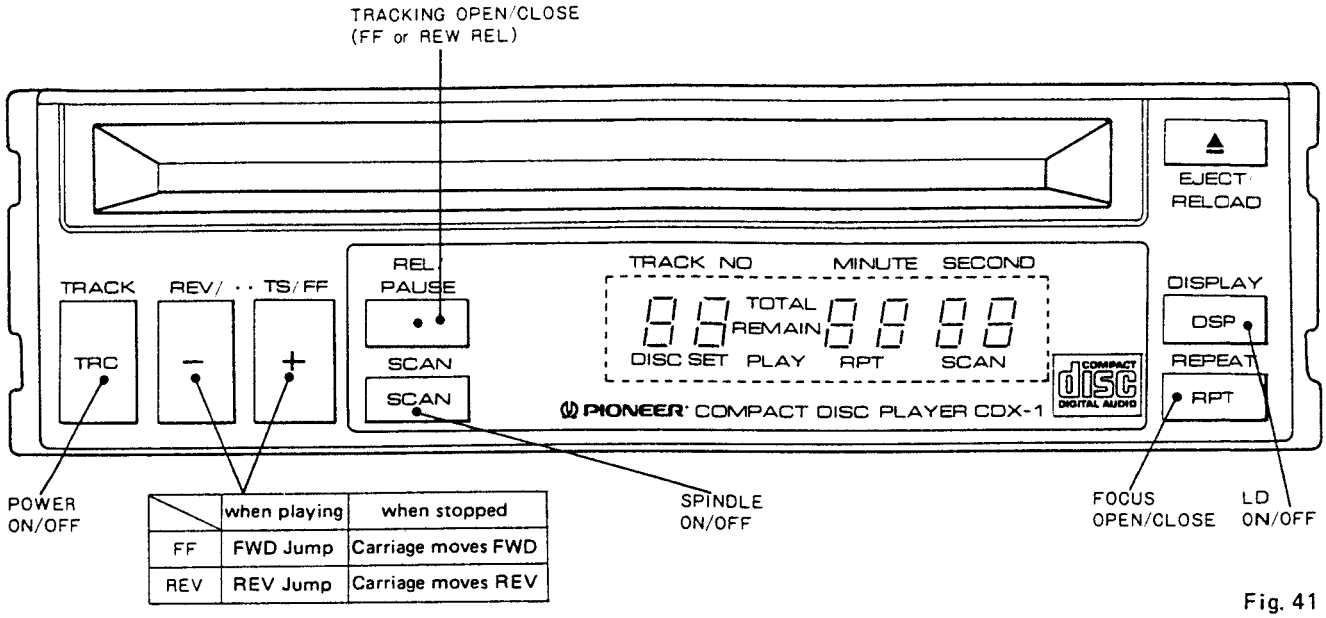


Fig. 40

• Test Mode Key Functions



	when playing	when stopped
FF	FWD Jump	Carriage moves FWD
REV	REV Jump	Carriage moves REV

Fig. 41

• CD Player Test Mode Switch Functions

Note: In the test mode, the track number and time display both reset to zero. (00 TRACK NO. 00 MINUTE 00 SECOND)

No.	Switch name		Function	Display	Operation description	Comments
1	TRC TRACK		POWER: ON/OFF	ON: PLAY	Makes the PD3023A pin 18 ($\overline{power}$) "L," and starts the DC-DC converter.	It won't operate if NO.1 (TRC) is not on.
2	DSP DISPLAY		LD POWER : ON/OFF	ON : SET	Makes the PD6029 pin 1 ($\overline{LD}$) "L," and fires the laser diode.	It won't operate if NO.1 (TRC) is not on.
3	SCAN SCAN		Spindle motor: ON/OFF	ON : DISC	Makes the PD3023A pin 20 (P/$\bar{S}$) "H," and turns the spindle motor.	It won't operate if NO.1 (TRC) is not on.
4	RP REPEAT		Focus servo: OPEN/CLOSE	CLOSE : ART	Makes the PD8010 pin 13 ($\overline{PUSH}$) "H," and closes the focus servo loop.	
5	REL/PAUSE		Tracking servo: OPEN/CLOSE	CLOSE : SCAN	Makes the PD8010 pin 17 (T-o/$\bar{c}$) "L," and closes the tracking servo loop.	Pushing this button once turns buttons one to four on changing the functions of the buttons. This stage persists until either the power is turned off or the clear button is pushed.
6	FF (+)	While playing	Forward jump	———	Outputs pulses to PD8010 pins 20 ($\bar{J}$-), 19 (J+) and 18 (T-AS) [causing a forward jump].	Normally playing (test mode).
		While stopped.	Drives the carriage motor	———	Makes the PD8010 pin 15 ($\bar{F}$/R) "L," and outputs a pulse to pin 16 (R-O/C) driving the carriage.	It won't operate if NO.1 (TRC) is not on.
7	REV (−)	While playing	Reverse jump	———	Outputs pulses to PD8010 pins 20 ($\bar{J}$-) 19 (J+) and 18 (T-AS)[causing a reverse jump].	Normally playing (test mode)
		While stopped.	Drives the carriage motor backward.	———	Makes the PD8010 pin 15 ($\bar{F}$/R) "H," and outputs a pulse to pin 16 (R-O/$\bar{C}$) driving the carriage.	It won't operate if NO.1 (TRC) is not on.

Step No.	Oscilloscope range		Test point	Adjustment point	Item to verify/ adjustment method	Adjustment steps (player section)
	X	Y				

Instruments used in adjustments and repairs

- Two-channel oscilloscope with delayed sweep
- Light power meter
- Test disc (YEDS-7)

- DC power supply (15 A or more)
- FTG Adaptor JIG (GGF-044)
- FTG Adjustment JIG (GGV-096)
- LPF-JIG (GGF-045)

Caution

- It is assumed that the oscilloscope has a 10:1 probe.
- The waveform pictures were taken using an oscilloscope with a 100 MHz band.
- Don't look into the object lens when the laser is on.
- Perform steps five through fifteen with the test disc in place.

Preparations

- Remove the upper and lower cases from the player section. When adjusting the tangential direction (step six) however, remove the main unit (2/3) first.
- Remove the upper and lower cases of the hideaway unit section.
- Be sure to short the pattern inside the TEST windown of the servo unit of the hideaway unit section, (switching to test mode) before turning on the power supply.
- Connect the player section and hideaway unit section.

Note:
Remove the servo unit pattern short from the hideaway unit section after making adjustments.

Step No.	Oscilloscope range X	Oscilloscope range Y	Test point	Adjustment point	Item to verify/ adjustment method	Adjustment steps (player section)
1	20mV/div	1ms/div	TP35	———	0 ± 50mV	**Focus return voltage check** • Push the arm and while turning off the DISC DETECT SW (S12), press the RELOAD button to initiate loading. Use a flathead screwdriver to push the arm, being careful that it doesn't get caught. • Push the TRC button and make sure that the Focus return voltage is within specifications.
2	20mV/div	1ms/div	TP36	VR103	0 ± 5mV	**Tracking return voltage check and adjustment** • As in step one, make sure that the tracking voltage is within specifications. If it isn't, adjust it using VR103 until it comes within specifications.
3	———	———	———	———	———	**Actuator operation check.** • Starting with step two, push the FF button and move the pickup toward the outside edge of the disc until it is in a place where it can be checked. • Push the REPEAT button and make sure that the pickup object lens moves up and down. Note: Check this for two seconds or less, and then push the REPEAT button again and stop the movement of the object lens. • Press the EJECT button to eject the disc.
4	———	———	———	VR4	0.25mW ± 0.01mW	**LD power check and adjustment** • While pushing the INTER LOCK SW (S11), push the FF button and move the pickup until the power sensor enters. • Place the power sensor on top of the pickup object lens. • Push the DISPLAY button, turn on the LD and check the emitting power. If it is not within specifications, quickly adjust it using VR4. • After adjustment, push the DISPLAY button again and turn off the LD. Note: When replacing the pickup, set VR4 to the minimum (turn completely to the left) and then begin adjustment. Also, do this with the INTER LOCK SW (S11) held down.

Step No.	Oscilloscope range X	Oscilloscope range Y	Test point	Adjustment point	Item to verify/ adjustment method	Adjustment steps (player section)
5	50mV/div	0.5μs/div	TP4 (RF, RFG) Signal processor unit	VR104	Maximum RF level	**Focus offset coarse adjustment** • While pushing the INTER LOCK SW (S11), push the TRC button and then the REV button and move the pickup toward the center of the disc. • Insert a test disc and load it with the RELOAD button. • Turn on the LD with the DSP button, and push the SCAN, REPEAT, and PAUSE buttons to make it play. • Push the FF button and go to the 23rd selection (approximately 23 minutes). The jump operation can be canceled with the PAUSE button. • Adjust the VR104 so that the RF level is at its maximum. Note: Steps five through fifteen take place with the test disc inserted.
6	50mV/div	0.5μs/div	TP4 (RF, RFG) Signal processor Unit	TAN adjustment screw	See waveforms	**Tangential direction incline adjustment** • Play selection 23 (approximately 23 minutes). • Adjust the tangential adjustment screw until the RF waveform peaks flatten out.

OK

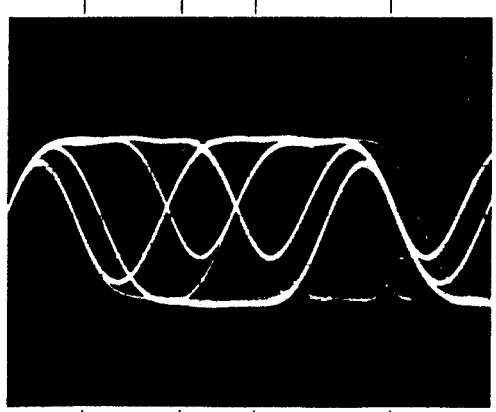


Fig. 43

NG

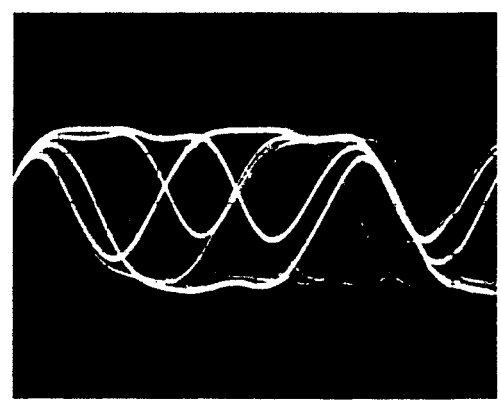


Fig. 42

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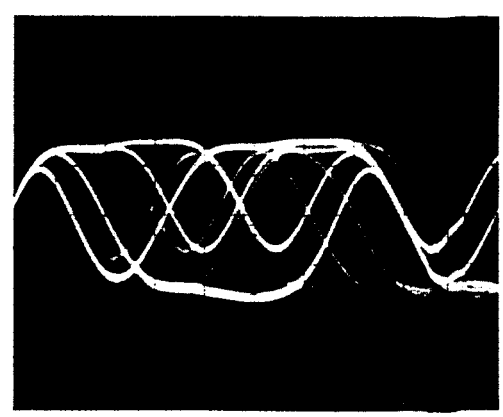

Fig. 44

Step No.	Oscilloscope range X	Oscilloscope range Y	Test point	Adjustment point	Item to verify/ adjustment method	Adjustment steps (player section)
7	0.2V/div	1μs/div	TP37	VR3	See waveforms	**Tracking error offset adjustment** • Play selection 14 (approximately 14 minutes). • With the PAUSE button pushed and the tracking servo open, adjust VR3 so that the waveform center is 0 volts.
8	0.2V/div	1μs/div	TP37	———	See waveforms	**Radial direction incline check** • The TE waveform positive and negative noise component should be less than or equal to half of the peak value of either the positive or negative side. (Not including the noise.) Check both the center and outside edge of the disc.

OK

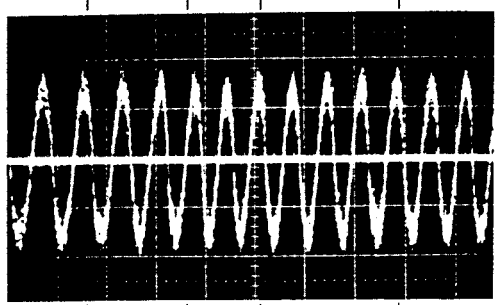

Fig. 46

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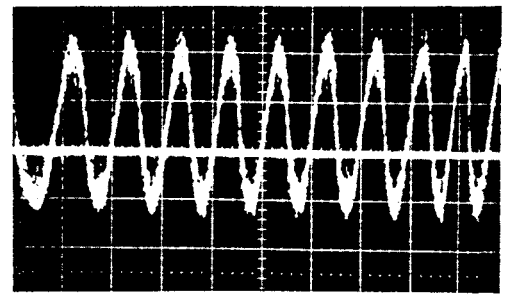

Fig. 45

NG

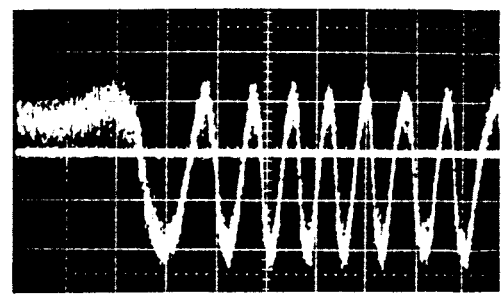

Fig. 47

OK

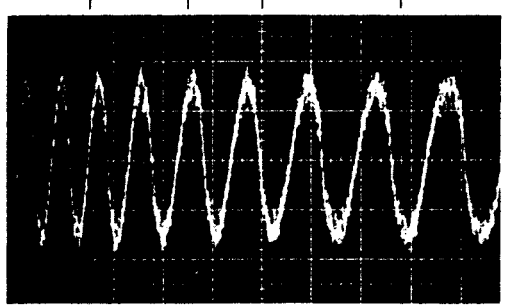

Fig. 49

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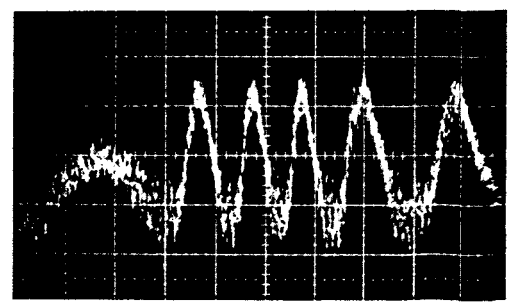

Fig. 48

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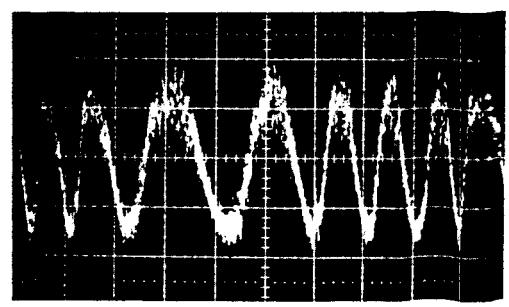
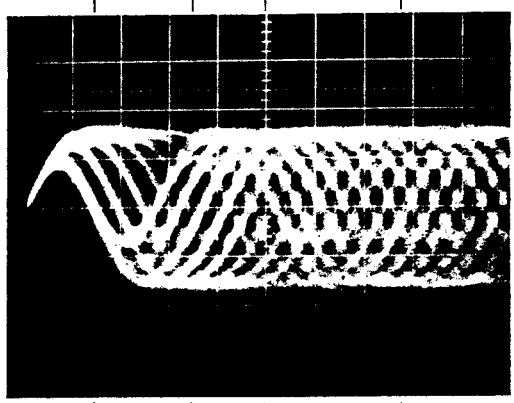
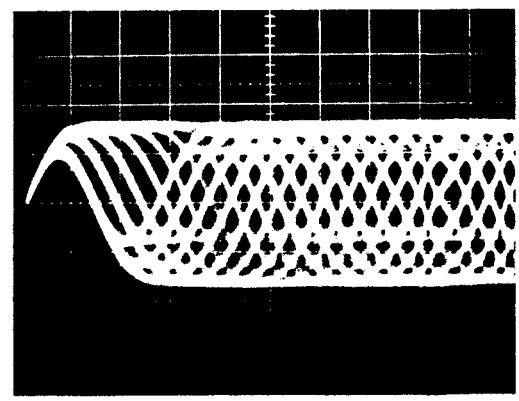


Fig. 50

Step No.	Oscilloscope range X	Oscilloscope range Y	Test point	Adjustment point	Item to verify/ adjustment method	Adjustment steps (player section)
9	10mV/div	1ms/div	TP35	————	Innermost track – 200 mV ±450 mV Outermost track. –200 mV ±560 mV Difference between innermost and outermost tracks should be within 90 mV.	**Spindle radial direction incline check** • Push the REV button and play the innermost track. • Make sure that the focus return DC voltage is within specifications. • Push the FF button and play the outermost track. • Make sure that the focus return DC voltage is within specifications. • Make sure that the DC voltage difference between the innermost and outermost tracks is within specifications. NOTE: Read the voltage of the waveform center by converting it into a DC value.
10	50mV/div	0.5μs/div	TP4 (RF, RFG) Signal processor unit	VR104	See waveforms	**Fine adjustment of focus offset** • Play selection 14 (approximately 14 minutes). • Adjust VR104 so that the RF output eye pattern is optimal (minimum jitter component). (minimum jitter component with maximum RF)
NG	 Fig. 51					OK  Fig. 52
11	0.2V/div	1ms/div	TP37	VR1	5 ± 0.5Vp-p	**Tracking error level adjustment** • Play selection 14 (approximately 14 minutes). • Push the PAUSE button and open the tracking servo. Then adjust VR1 until the tracking error level is within specifications. However, the level should be read at the noise center. Note: If the tracking error offset adjustment has been shifted, then begin adjustment with step seven.
12	50mV/div	0.5μs/div	TP4 (RF, RFG) Signal Processor unit	VR2	1.5 ± 0.2V	**RF output level adjustment** • Play selection 14 (approximately 14 minutes). • Adjust VR2 until the RF output is within specifications.

Step No.	Oscilloscope range X	Oscilloscope range Y	Test point	Adjustment point	Item to verify adjustment method
13	———	———	TP15 TP17	VR105	
14	———	———	TP12 TP13	VR101	

FTG ADJUSTMENT JIG
(GGV-096)

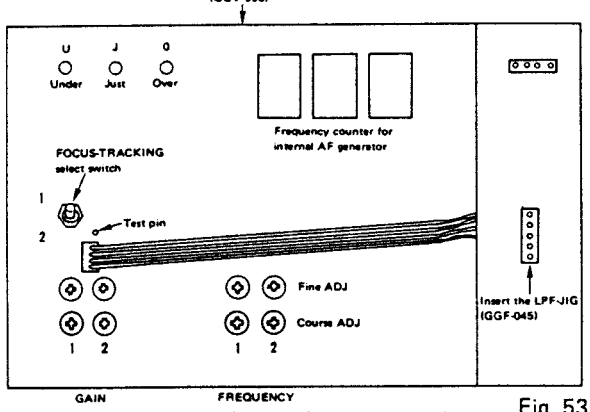


Fig. 53

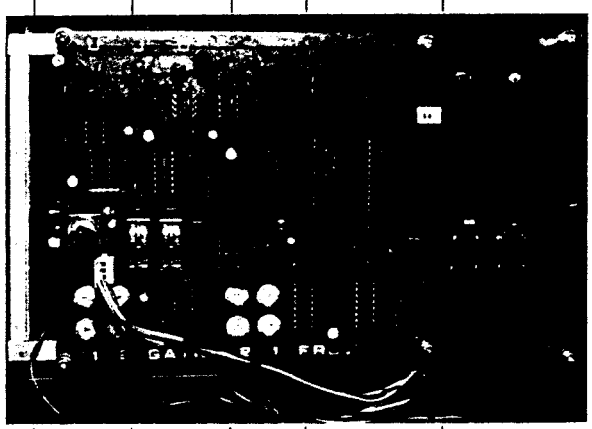


Fig. 54

Adjustment steps (player section)

Focus servo gain adjustment

(a) Turn the selector switch of the jig to 1.
(b) Use search to locate track #14.
(c) Connect Orange wire to TP15, Brown wire to TP17, and Black wire to TP18 (GND).
(d) Adjust VR105 to turn J-LED on.

Tracking servo gain adjustment

(a) Turn the selector switch of the jig to 2.
(b) Use search to locate track #14.
(c) Connect Yellow wire to TP12, Red wire to TP13, and Black wire to TP18 (GND).
(d) Adjust VR101 to turn J-LED on.

- Initial setting the FTG ADJUSTMENT JIG

(a) Insert the connector of the LPF-JIG (GGF-045) for CDX-1 into the connector on the FTG ADJUSTMENT JIG.
(b) Turn the power switch on.
(c) Turn the FOCUS-TRACKING selector switch on the jig to 1. Set the oscillating frequency of the internal oscillator at 600 Hz with the frequency potentiometer-1. The oscillating frequency is displayed on the 7-segment LEDs. First, adjust the frequency roughly with the lower side potentiometer, then adjust it finely with the upper side potentiometer.
(d) Connect the probe of oscilloscope at the TEST PIN located at the right side of the selector switch. Adjust the GAIN potentiometer-1 so that the peak to peak voltage of the waveform at the TEST PIN is 140mV.
(e) Turn the selector switch on the jig to 2. In the same procedure above, adjust FREQ potentiometer-2 so that the oscillating frequency of the internal oscillator is 1.5KHz.
(f) In the same procedure above, adjust the GAIN potentiometer-2 so that the peak to peak voltage of the waveform at the TEST PIN is 140mV.

Step No.	Oscilloscope range X	Oscilloscope range Y	Test point	Adjustment point	Item to verify/ adjustment method	Adjustment steps (player section)
15	CH1 0.5V/div	0.1ms/div	TP11	VR102	250μs ± 50μs	**Jump gain adjustment** • Play selection 10 (approximately 10 minutes); then press the FF button (forward jump). • Adjust VR102 until the $\overline{\text{T-AS}}$ signal (TP11) "H" level space is within specifications. • Observe the TE waveform and make sure that the overshoot quantity after a jump is less than or equal to half the jump peak value. If it isn't, Adjust VR102 until it is within specifications. Make sure that the $\overline{\text{T-AS}}$ signal "H" level space is within specifications at this time.
	CH2 0.1V/div	0.5ms/div	TP37	VR102		

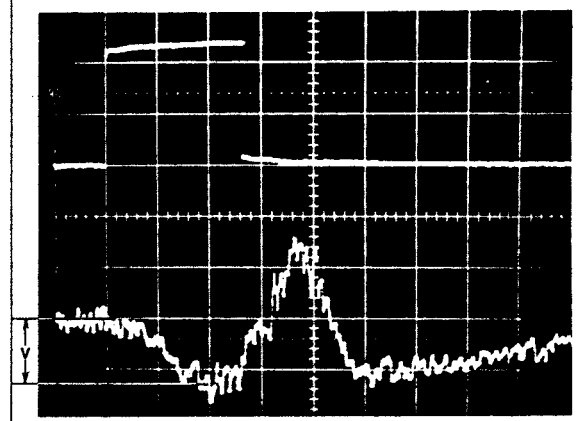


Fig. 55

• Play selection 20 (approximately 20 minutes); then press the REW button (reverse jump).

• Make sure that the "H" level port of the $\overline{\text{T-AS}}$ signal is within specifications.

• Make sure that the TE waveform overshoot quantity after the jump is also within specifications.

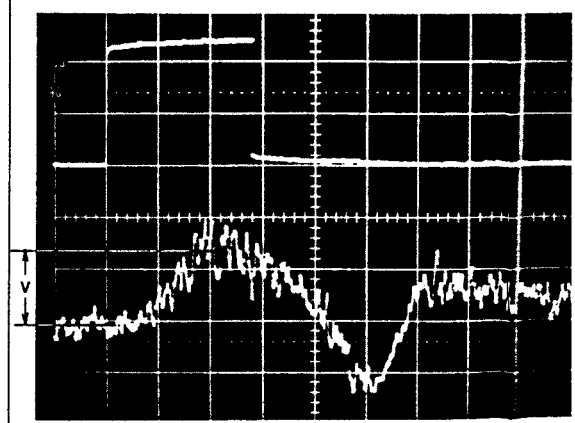


Fig. 56

Step No.	Oscilloscope range X	Oscilloscope range Y	Test point	Adjustment point	Item to verify/ adjustment method	Adjustment steps (Hideaway unit section)
						Instruments used in adjustments and repairs • Two-channel oscilloscope with delayed sweep • Test disc (YEDS-7 or demonstrations disc) • DC power supply (15 A or more) **Caution** • It is assumed that the oscilloscope has a 10 : 1 probe. **Preparations** • For the hideaway unit section, set up the signal processor by removing the four screws, avoiding short circuits. • Connect the player section and the hideaway unit section.
1	0.1V/div	1ms/div	VCO	L3	4.3V	**VCO adjustment** • Insert the disc and set to play. • Adjust L3 until the DC voltage is within specifications
2	CH1 0.2V/div CH2 0.2V/div	0.1μs/div 0.1μs/div	DEFM PLCK	VR1		**PLL phase adjustment** • Insert the disc and set to play. • Connect TP (DEFM) to channel one and TP (PLCK) to channel two (set the trigger with PLCK). • Align the PLCK leading edge to the DEFM jitter center.
3	0.2V/div	50μs/div	APC	VR2	Duty ratio 50%	**SPDL offset adjustment** • Insert the disc and set to play. • Adjust VR2 so that the signal at the APC (automatic phase control) has a duty ratio of 50%.

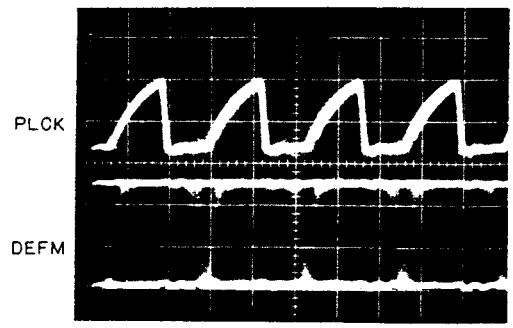


Fig. 57

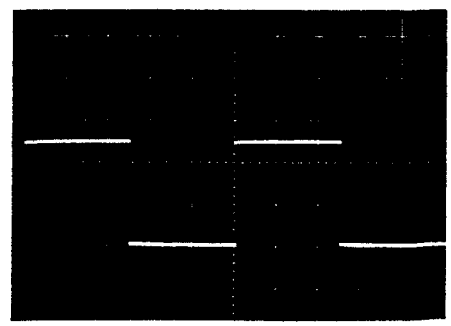
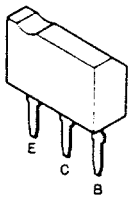


Fig. 58

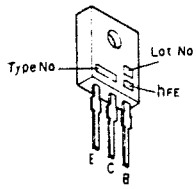
8. ICs AND TRANSISTORS INFORMATION

*IC's marked by * are MOS type.*
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

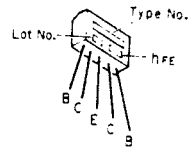
2SD1226M



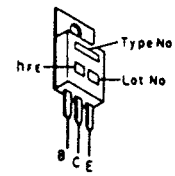
2SC1847
2SA886



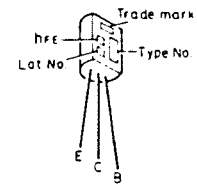
2SA798



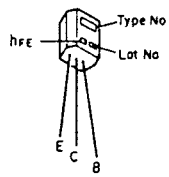
2SC2654



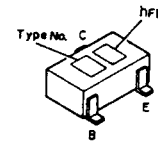
2SA683



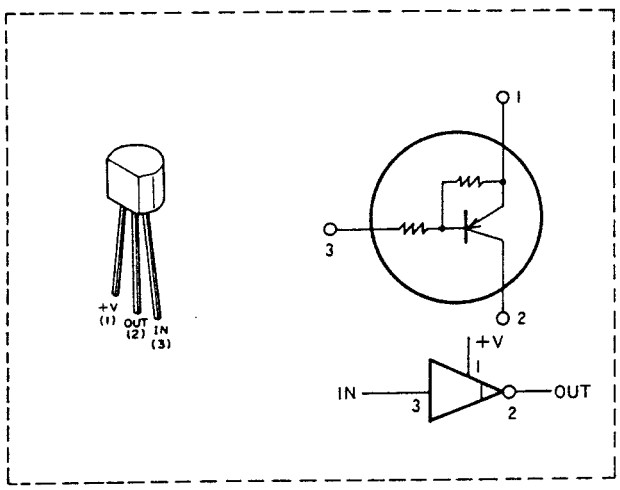
2SC2458
2SA1048



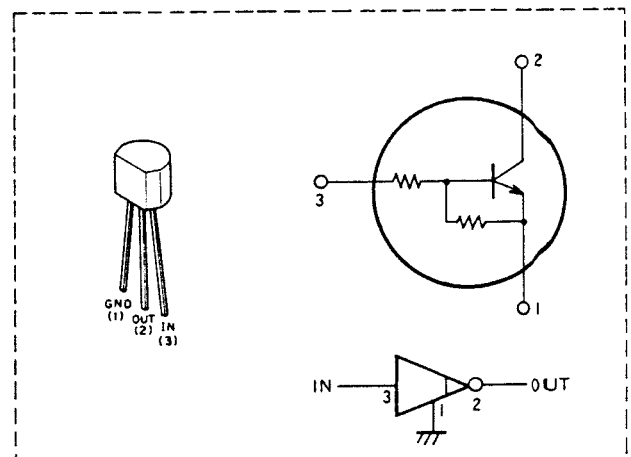
Parts No.	Indication(Type No., hFE)
2SC2712-LG	LG
2SC2712-LL	LL
2SA1162-SG	SG
2SA1162-SY	SY



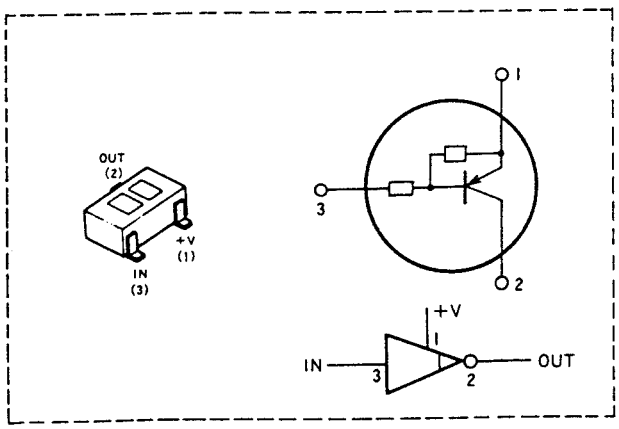
DTA124ES



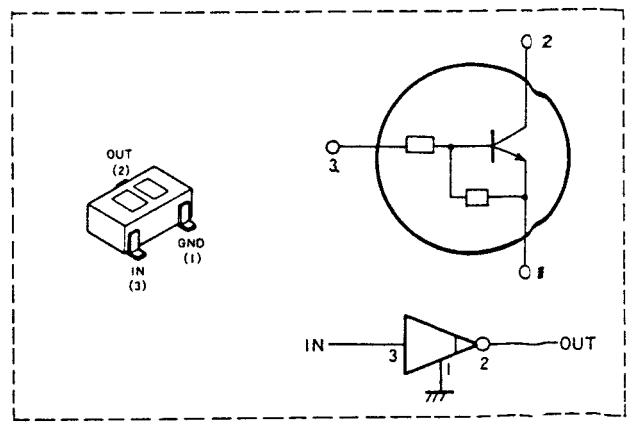
DTC124ES



UN2111
Chip transistor

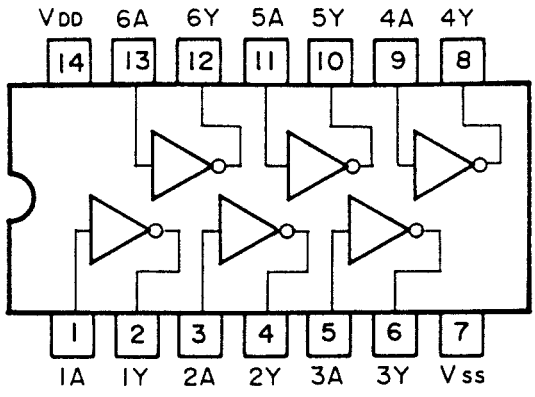


UN2211
Chip transistor

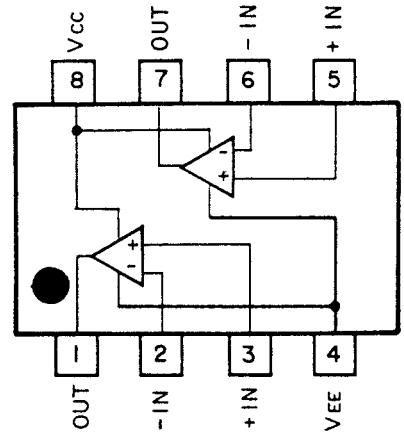


- **Main Unit**

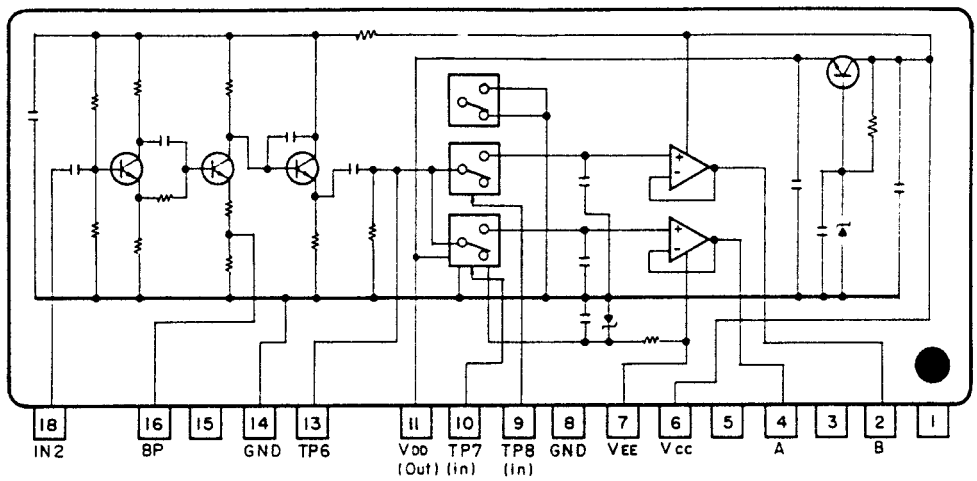
*IC1 : TC40H004F



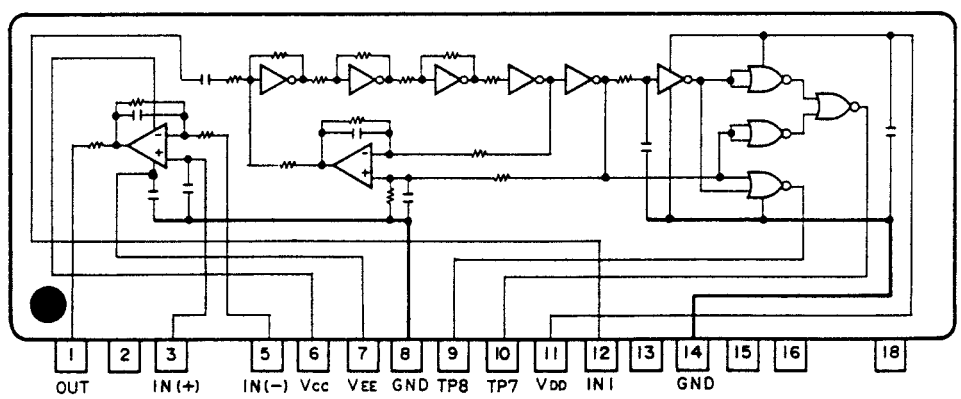
IC2 : NJM4558M



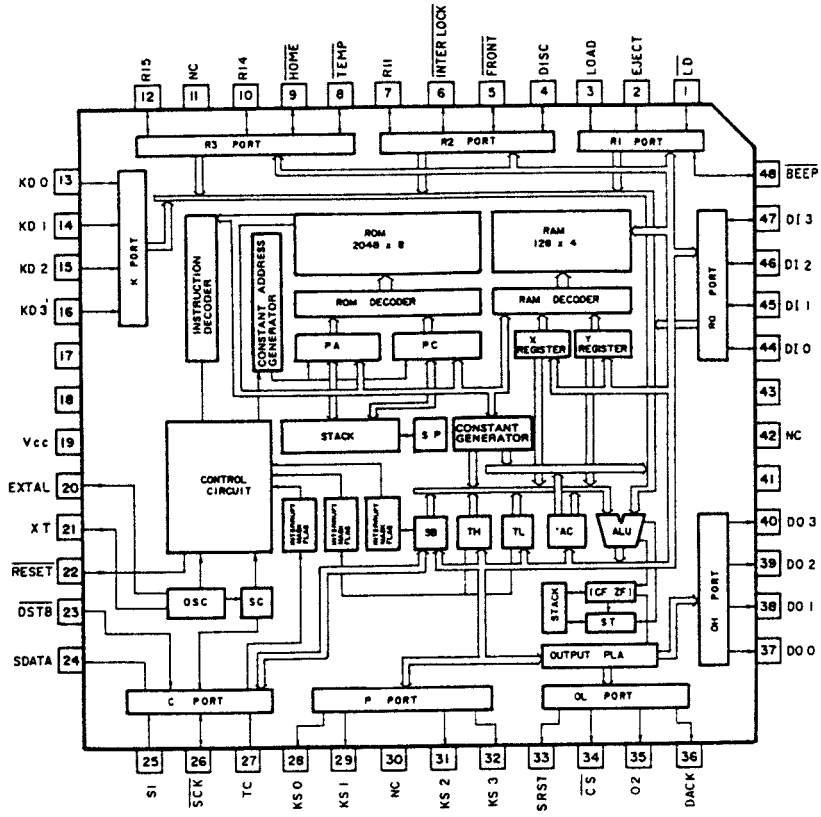
IC3 : KHA303



IC4 : KHA304



*IC6 : PD6029

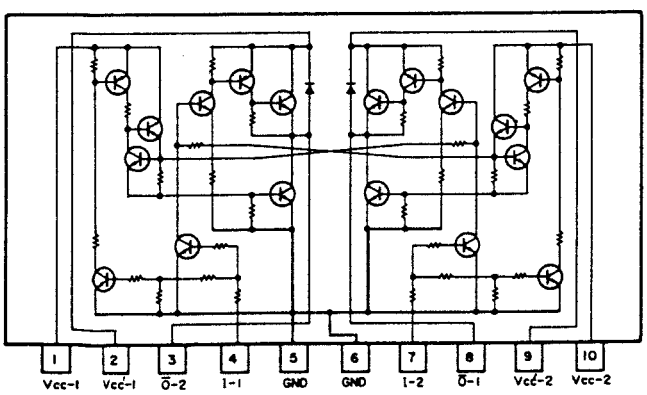


PD6029 Pin Functions

Pin	Pin name	I/O	Function
1	$\overline{LD}$	Output	Turns the laser diode on and off. It turns on at "L" level.
2	EJECT	Output	Reverses the loading motor, and ejects the disc.
3	LOAD	Output	Runs the loading motor forward and loads the disc.
4	DISC	Input	Detects whether or not there is a disc loaded. Inputs "H" level when a disc has been loaded.
5	$\overline{FRONT}$	Input	Detects whether or not the disc plate unit (part of the cassette mechanism unit) is in front. It indicates the completion of ejection.
6	$\overline{INTFR\ LOCK}$	Input	Detects whether or not the disc plate unit is in back and indicates the completion of loading.
7	N.C		
8	$\overline{TEMP}$	Input	Detects rises in internal temperature.
9	$\overline{HOME}$	Input	Detects whether or not the pickup is in the home position.
10 12	N.C		
13 16	KD0 } KD3	Input	Takes in four-bit data in response to the key that has been pressed.
17	N.C		
18	N.C		
19	Vcc		+5V power supply
20	EXTAL		Built-in clock generator for outside circuits.
21	XT		
22	$\overline{RESET}$	Input	Is reset at "L" level.

Pin	Pin name	I/O	Function
23	$\overline{DSTB}$	Input	This is an external interrupt input and is used as a data strobe during communications.
24	SDATA	Output	This is a serial transfer line for display data to IC301 (PD7005).
25	SI	Input	Switches from normal mode to the chip check mode during program reset ("H" level is normal mode, "L" level is chip check mode.)
26	SCK	Output	Synchronous timing output during serial transfer.
27	N.C		
28	KS0	Output	Key SCAN output for input key sense.
29	KS1		
30	N.C		
31	KS2	Output	Key SCAN output for input key sense.
32	KS3		
33	SRST	Output	Reset output for IC301 (PD7005)
34	$\overline{CS}$	Output	Output for making IC301 active.
35	N.C.		
36	DACK	Output	Output used to acknowledge data in communications.
37 ~ 40	DO0 ~ DO3	Output	Four-bit parallel data line used during communications.
41	Vss		GND
42	N.C		
43	N.C		
44 ~ 47	DI0 ~ D13	Input	Four-bit parallel input data line.
48	$\overline{BEEP}$	Output	Controls the beep generator and beeps at "L" level. (30 mSec.)

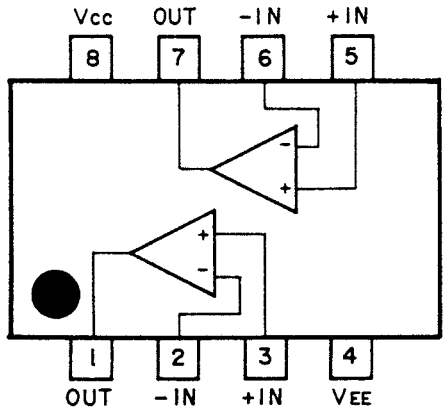
IC7 : M54546L



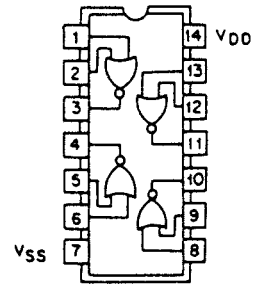
M54546L Pin Functions

Pin	Pin name	I/O	Function
1	Vcc-1		Power supply
10	Vcc-2		
2	Vcc'-1		Output power supply, motor output power supply.
9	Vcc'-2		
3	O-2	Output	Becomes "H" level during EJECT.
8	O-1	Output	Becomes "H" level during LOAD.
4	I-1	Input	Becomes "H" level during LOAD.
7	I-2	Input	Becomes "H" level during EJECT.
5	GND		GND
6	GND		

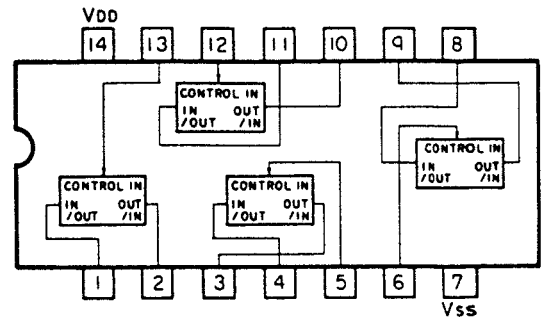
IC5 : NJM2904D



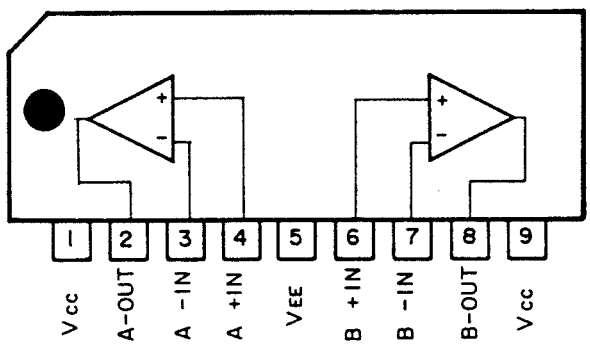
*IC8 : TC4001BF



*IC101 : TC4066BP

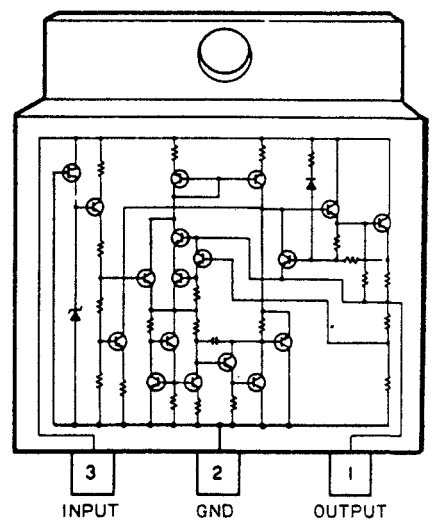


IC9 : NJM2903M

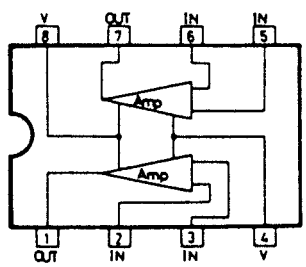


• Servo Unit

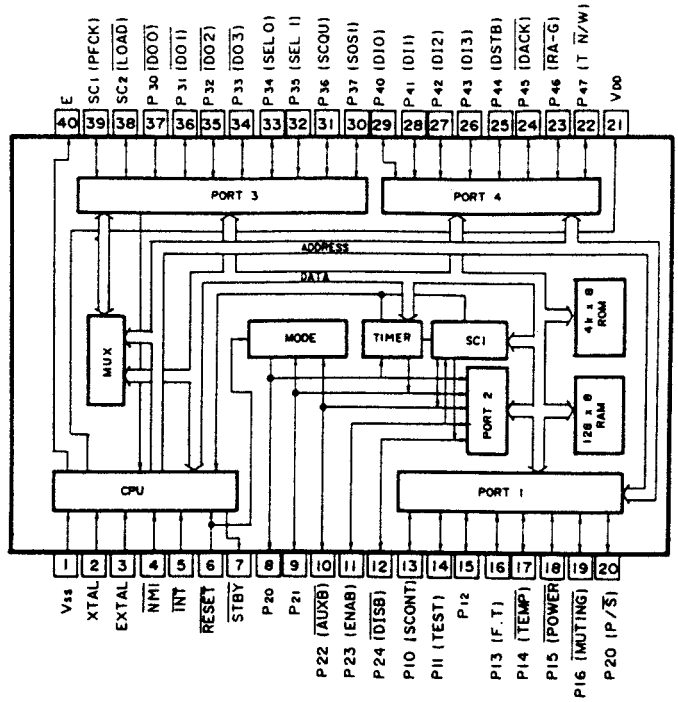
IC1, IC11 : NJM78M05A



IC102~IC104 : TA75558P



*IC2 : PD3023A



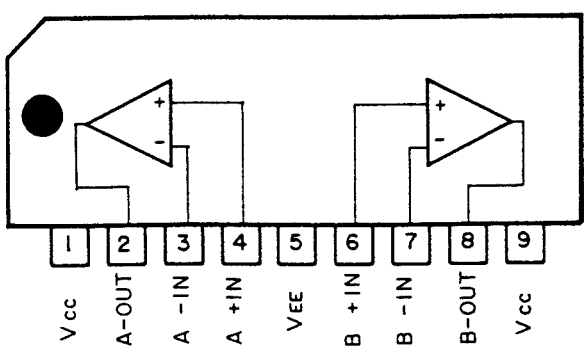
PD3023A Pin Functions

Pin	Pin name	I/O	Function
1	Vss		GND
2	XTAL	Input	System clock crystal (4 MHz) connector.
3	EXTAL	Output	
4	$\overline{NMI}$	Input	A non-maskable Interrupt input pin. This pin orders the unit into the back up mode when a power supply cut-off is detected.
5	$\overline{INT}$	Input	Interrupt input. A signal for stopping track counting is input to this pin. (Active "L".)
6	$\overline{RESET}$	Input	Reset input. Connects to the reset circuit.
7	$\overline{STBY}$	Input	Standby control input. When this pin is turned to "L" level, the current consumption of the CPU during back-up can be reduced. It is connected directly to pin 13 and goes through pin 4 ($\overline{NMI}$), and R9, and operates as follows: 1. When pin 4 becomes "L" level, the power supply is cut off. 2. When PD3023A detects a power supply cut-off, it starts to save RAM data, and prepares to go into backup mode. 3. When preparations are complete, it changes pin 13 (SCONT) to high impedance. 4. When pin 13 becomes high impedance, pin 7 ($\overline{STBY}$) is brought down to "L" level by R9 and becomes a low-power consumption back up. Back-up mode can be changed back to normal operation with input from pin 6 ($\overline{RESET}$).
8	P20		Connects to +5V line.
9	P21		
10	P22 ($\overline{AUXB}$)	Output	Commands AUX+B output. Outputs "L" level when player is in operation.
11	P23 (ENAB)	Output	Commands SWD+5 V output. This becomes "H" level and maintains "H" level 150 ms after RESET is input during CPU operation. It also issues a start command to PD6029.
12	P24 ($\overline{DISB}$)	Input	DISB detection input. Connects to the AUX control circuit and detects DISB at "L" level.
13	P10 (SCONT)	Output	Standby control output. Normally "H" level.
14	P11 (TEST)	Input	Test mode command input The chip goes into test mode when it is reset while this pin is "L".
15	P12		Connects to +5 V line.
16	P13 (F · T)	Input	Focus trigger input. Acts as a performance monitor for the FOCUS system, it determines the FOCUS system to be normal at "H" level.

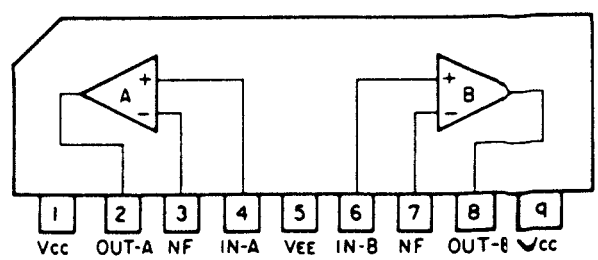
Pin	Pin name	I/O	Function
17	P14 (TEMP)	Input	Temperature rise detection input. At "L" it determines that the temperature is too high, stops operation and displays "HH HHHH."
18	P15 ($\overline{\text{POWER}}$)	Output	D-D converter ON/OFF control output. At "L" level, the D-D converter turns on and the servo system is supplied with power.
19	P16 ($\overline{\text{MUTING}}$)	Output	Muting control output. At "L" level, the muting circuit turns on, and the audio output drops to GND.
20	P17 (P/$\overline{\text{S}}$)	Output	Spindle motor (START/STOP) control. At "H" level, the spindle motor starts. At "L" level, the spindle motor stops.
21	VDD		Power supply (5 V ±0.25V).
22	P47 (T $\overline{\text{N}}$/W)	Output	While playing the level is "L", and the band is narrow. During search or jump, the level is "H" and the servo band is wide.
23	P46 ($\overline{\text{RA-G}}$)	Output	Normally "H" level, but changes to "L" level during jumps. If pin 16 (R-O/$\overline{\text{C}}$) is "L" level, it adds offset to the carriage servo.
24	P45 ($\overline{\text{DACK}}$)	Input	Data acknowledge input. During communications with the sub-microcomputer PD6029, it receives the data acknowledge from PD6029. Active "L."
25	P44 (DSTB)	Output	
26 ⟆ 29	P43 (D13) ⟆ P40 (D10)	Input	Connects to a four-bit bi-directional communications interface and takes data from the data bus.
30	P37 (SOSI)	Input	Sub-code sync pattern input.
31	P 36 (SCQU)	Input	Sub-code Q channel input.
32	P35 (SEL1)	Output	PD8010 function selection
33	P36 (SEL0)	Output	
34 ⟆ 37	P33 (DO3) ⟆ P30 (DO0)	Output	Four-bit data output. Data output for PD8010, and data output during communications with PD6029.
38	$\overline{\text{LOAD}}$	Output	Data strobe output for outputting data to PD8010. One-micro-second pulse.
39	PFCK	Input	When the sub-code is read as normal, a 136 μsec. signal (duty: 50%) is input.
40	E	Output	System clock frequency divider output. 1 kHz (duty: 50%), which is one fourth of the system clock frequency, is output to this pin. It is used as the clock for PD8010 clock.

SEL 1	SEL 0	Operation mode
0	0	———
0	1	Latch "A" select (mainly for FOCUS system control).
1	0	Latch "B" select (mainly for TRACKING system control).
1	1	Counter preset

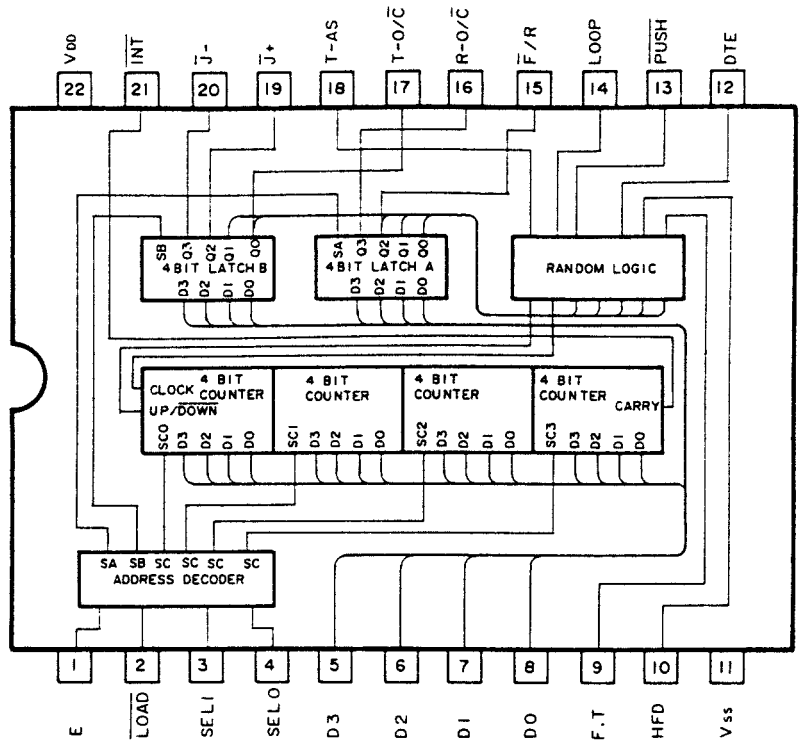
IC4 : NJM2903S



IC5, IC7, IC8 : TA75558S



*IC3 : PD8010

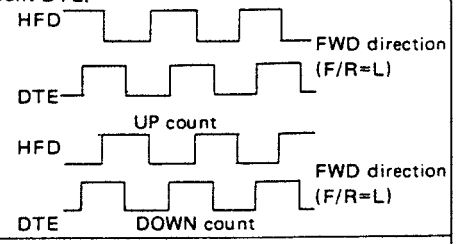
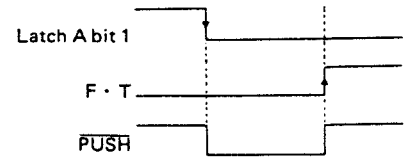
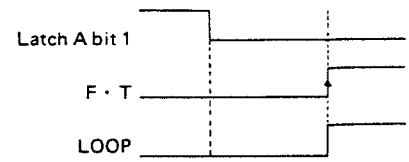


The PD8010 is a random access controller which was developed for mobile CD players. Using commands from the microcomputer (PD3023A) in can perform:

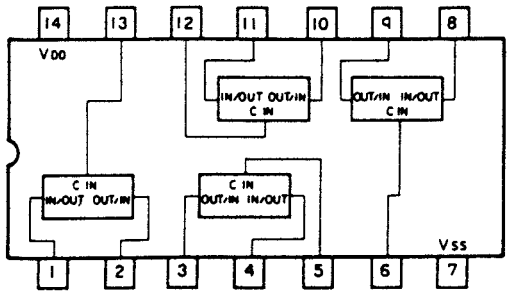
1. Jump operations
2. High-speed random access operations
3. Controls the focus servo circuit.

PD8010 Pin Functions

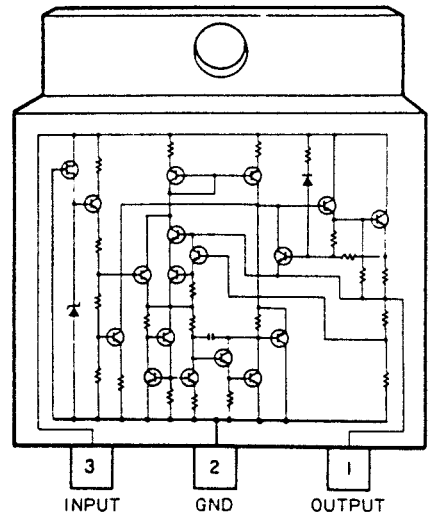
<table>
<tr><th>Pin</th><th>Pin name</th><th>I/O</th><th>Functions</th></tr>
<tr><td>1</td><td>E</td><td>Input</td><td>System clock input (1 MHz)</td></tr>
<tr><td>2</td><td>$\overline{\text{LOAD}}$</td><td>Input</td><td>Data line strobe input</td></tr>
<tr><td>3</td><td>SEL1</td><td rowspan="2">Input</td><td rowspan="2">Select address input pins for selecting four-bit latch "A," "B," or the 16-bit counter
<table>
<tr><th>SEL 1</th><th>SEL 0</th><th>Operation mode</th></tr>
<tr><td>0</td><td>0</td><td>———————</td></tr>
<tr><td>0</td><td>1</td><td>Latch "A" selected</td></tr>
<tr><td>1</td><td>0</td><td>Latch "B" selected</td></tr>
<tr><td>1</td><td>1</td><td>Counter preset</td></tr>
</table></td></tr>
<tr><td>4</td><td>SEL0</td></tr>
<tr><td>5</td><td>D3</td><td>Input</td><td rowspan="2">Four-bit data line (Input pins)</td></tr>
<tr><td>8</td><td>D0</td><td>Input</td></tr>
</table>

Pin	Pin name	I/O	Function
9	F · T	Input	FOCUS timing latch clock input pin. Used as input pins for the random logic circuit. (When the random logic circuit operates, it closes the focus servo loop.) It is input into the servo control logic. Signal produced by making binary the envelope of the external RF signal which is 90° out of phase from the TE input. When there is an RF signal, it becomes "H." *The internal 16-bit counter uses the phase differences among the DTE input and the E-OR output of $\overline{F}$/R and the HFD input, to select UP/$\overline{DOWN}$ and to count DTE. 
10	HFD	Input	
11	VSS		GND
12	DTE	Input	This pin is input into the servo control logic. Input into this pin is the signal produced by making binary the tracking error signal which is 90° out of phase from the HFD pin Signal
13	$\overline{PUSH}$	Output	Becomes "L" level at the trailing edge of latch A bit 1 output, and returns to "H" level at leading edge of the F · T input pin.  When the level is "L," the lens is pushed out. It draws the lens in at "H" level, and opens the FOCUS speed feedback.
14	LOOP	Output	This is a FOCUS timing latch output pin. When latch A bit 1 is "L" level, the rising edge of the F · T input pin changes it to "H" level.  Used as a signal to open/close the FOCUS LOOP. When the signal is "H" level, the focus loop becomes closed.
15	$\overline{F}$/R	Output	Sets the carriage direction. "L" level advances toward the outside edge of the disc.
16	R-O/$\overline{C}$	Output	Acts as a high-speed carriage motion control pin during player search operations. The carriage moves at high speed at "L" level.
17	T-O/$\overline{C}$	Output	Output pins for opening/closing the carriage servo loop. When "L" level is output from this pin, the external carriage loop closes.
18	T-AS	Output	Acts as a tracking servo loop open/close switch. When the signal is "H" level, the tracking servo loop is closed.
19	$\overline{J+}$	Output	Outputs "L" level during jumps, and is used as the JUMP+ signal output pin that flows the current for driving the lens toward the center of the disc.
20	$\overline{J-}$	Output	Outputs "L" level during jumps and is used as the JUMP– signal output pin that flows the current for driving the lens toward the outside edge of the disc.
21	$\overline{INT}$	Output	Outputs "L" level when it detects a carry when the 16-bit counter is performing a count operation. When new data is preset by the 16-bit counter, it returns to "H" level.
22	VDD		Power supply (+5V).

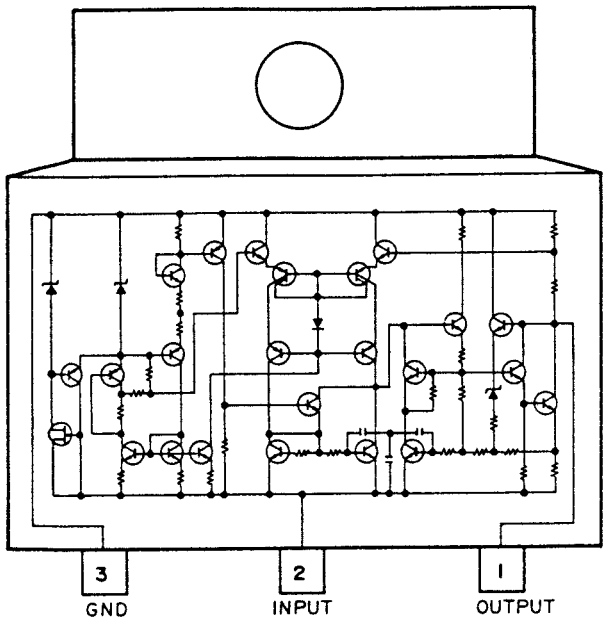
*IC6 : TC4066BP



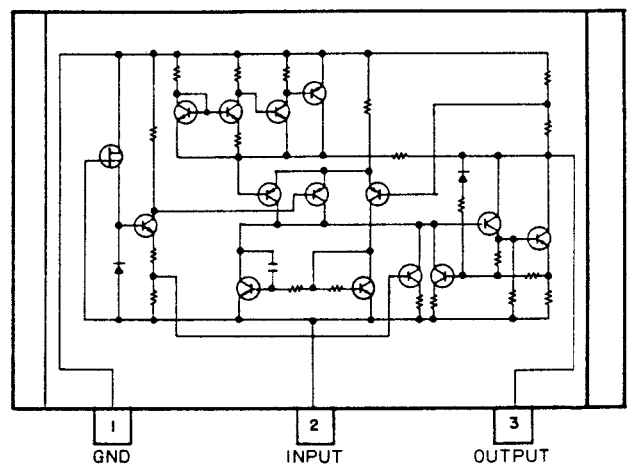
IC9 : NJM78M12A



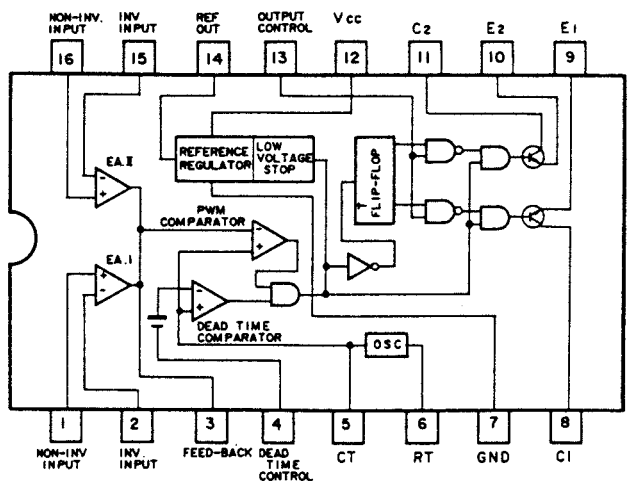
IC10 : NJM79M12A



IC12 : NJM79L05A

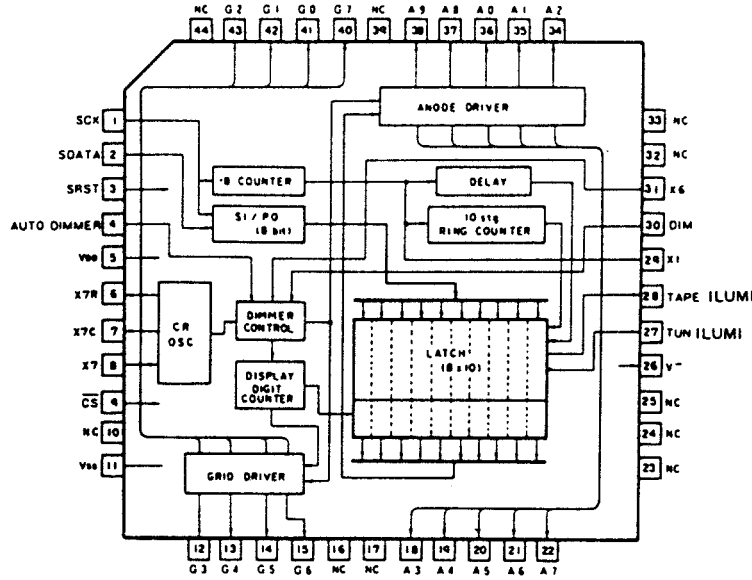


IC50 : μPC494C



• Display Unit

*IC301 : PD7005

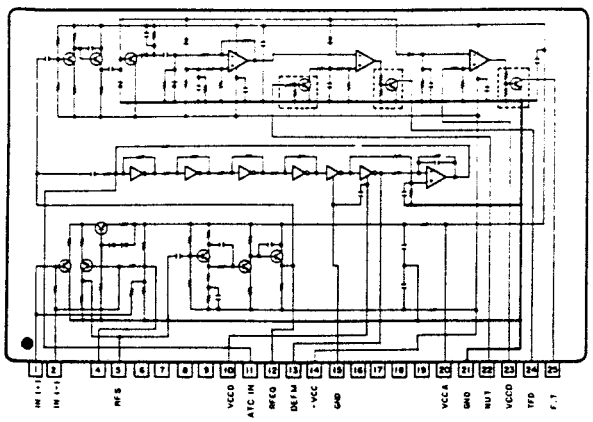


PD7005 Pin Functions

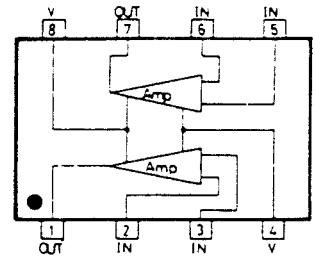
Pin	Pin name	I/O	Function
1	SCK	Input	Serial interface, system lock input.
2	SDATA	Input	Data input.
3	SRST	Input	Reset.
4	AUTO DIMMER		Not in used
5	VDD		+5 V power supply
6 ∫ 8	X7R ∫ X7		Oscillator circuit
9	CS	Input	Chip selection signal input. Active "L."
10	N.C		
11	VSS		GND
12 ∫ 15	G3 ∫ G6	Output	FL grid output.
16	N. C		
17	N. C		
18 ∫ 21	A3 ∫ A6	Output	FL anode output.
22	N. C		
23 ∫ 25	N. C		
26	V–	Output	Grid output. Negative voltage output pin for pull-down resistance.
27 ∫ 29	TUN illumination TAPE illumination XI		Not in used
30	DIM	Input	The LEDs become dark when ILLUMI+B is applied.
31 ∫ 33	N. C		
34 ∫ 37	A2 A1 A0 A8	Output	FL anode output.
38 ∫ 40	N. C		
41 ∫ 43	G0 ∫ G2	Output	FL grid output.
44	N. C		

• Signal Processor Unit

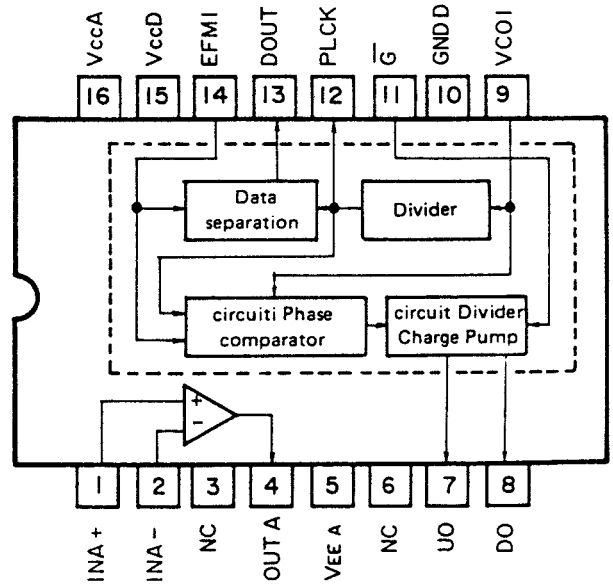
IC1 : KHA301



IC2, IC7 : NJM4558DD



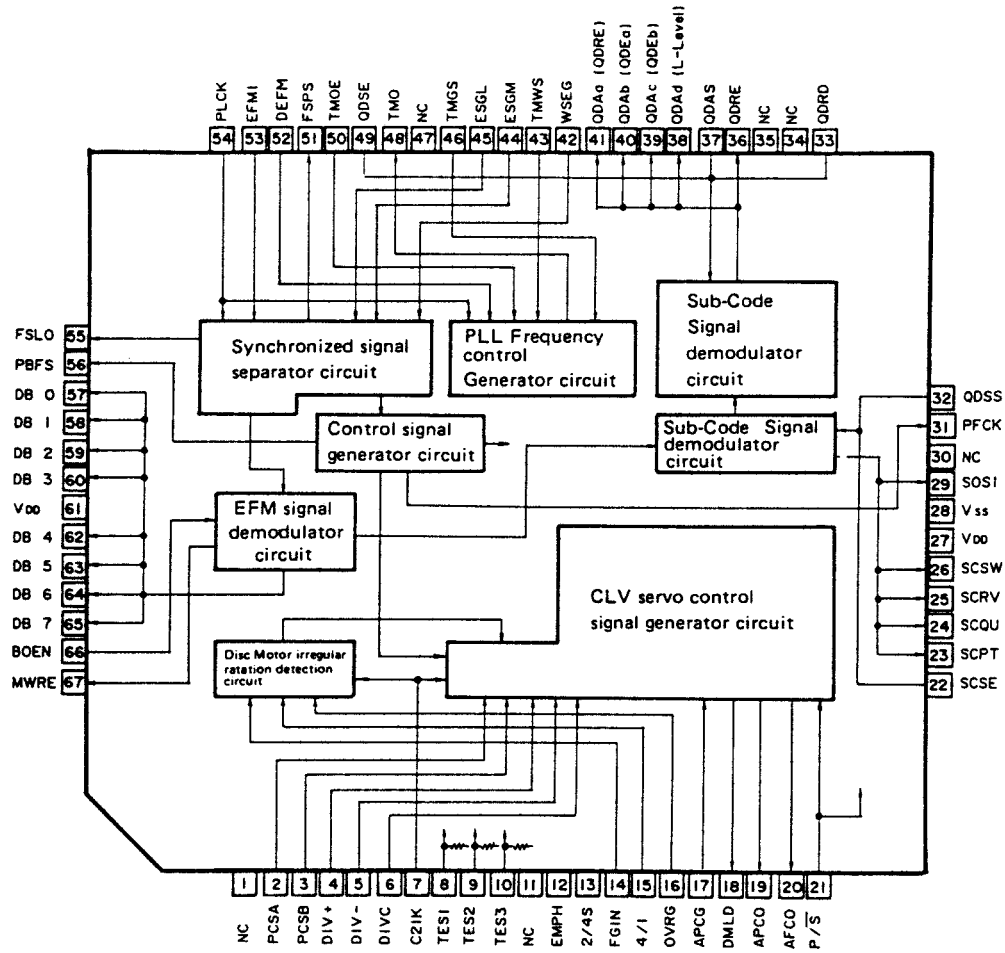
IC3 : TD6315AP



TD6315AP Pin Functions

Pin	Pin name	I/O	Function
1	INA+	Input	Internal operational amplifier + input.
2	INA–	Input	Internal operational amplifier – input.
3	N. C		Unconnected. Has the same electric potential as INA+.
4	OUTA	Output	Internal operation amplifier output.
5	VEEA		GND
6	N. C		Unconnected. Has the same electric potential as INA+.
7	UO	Output	Charge pump up signal output.
8	DO	Output	Charge pump down signal output.
9	VCOI		VCO input.
10	GNDD		Digital GND
11	$\overline{G}$	Input	Input pins which make charge pump output UO and DO high impedance. When this pin is "L" level, it enters high impedance mode, and holds the VCO frequency.
12	PLCK	Output	Clock for separating data generated from DEFM input signals by the PLL circuit.
13	D OUT	Output	EFMI signal output.
14	EFMI	Input	Input pin for the digital signal (EFMI) that is produced when the RF signal reproduced from the disc goes through the data slicer.
15	Vcc D		Digital power supply (+5 V).
16	Vcc A		Analog power supply (+12 V).

* IC4 : TC9178F



TC9178F Pin Functions

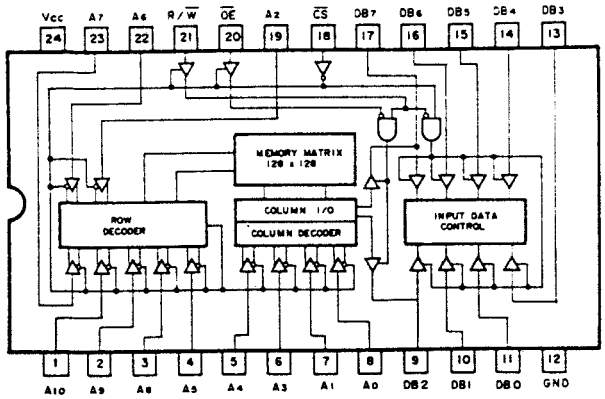
Pin	Pin name	I/O	Function
1	N. C		
2	PCSA	Input	CLV servo control APS signal circuit phase comparison frequency selector.
3	PCSB	Input	Phase comparison frequency fc = 7.35 kHz (frame synchronizing signal/N).
			PCSA: L, PCSB: L, N: 6, fc (Hz): 1225
4	DIV+	Input	Inputs to these pins changes the reference frequency for comparing phases in the CLV servo control signal APC generator circuit. It is input in the form of a buffer memory status signal from TC9179F. The amount of variation can be selected using the DIVC pin.
5	DIV−	Input	
6	DIVC	Input	DIV+ / DIV− / DIVC / Standard frequency division ratio / Disc motor revolutions: H / L / L / 1/287.5 / Speed up; L / H / L / 1/288.5 / Slow down; L / H / / 1/288 /
7	C21K	Input	2.1188 MHz input. Duty 50%. The crystal oscillator frequency (8.4672 MHz) from TC9179F is frequency divided by four and input into this pin.
8 ∫ 10	TES 1 ∫ TES 3	Input	Test input. Normal operation at "H" level or when open. (Not in use.)

<table>
<tr><th>Pin</th><th>Pin name</th><th>I/O</th><th>Function</th></tr>
<tr><td>11</td><td>N. C</td><td></td><td></td></tr>
<tr><td>12</td><td>EMPH</td><td>Output</td><td>This output pin determines whether or not there is any emphasis displayed by the sub-code signal Q control bit.
The de-emphasis is on at "H" level.</td></tr>
<tr><td>13</td><td>N. C</td><td></td><td></td></tr>
<tr><td>14</td><td>FGIN</td><td>Input</td><td>Input pin for the disc motor FG pulse.
Either one or four pulses are input from this pin for each revolution of the disc motor. It controls the AFC and APO output so that the disc motor rpms are within 175 ~ 740 rpms.
<table>
<tr><th>Disc motor revolutions (rpm)</th><th>AFCO</th><th>APC</th></tr>
<tr><td>~ 175</td><td>"H" level fixed</td><td>Duty cycle 50% output fixed</td></tr>
<tr><td>175 ~ 740</td><td>Normal operation</td><td>Normal operation</td></tr>
<tr><td>740 ~</td><td>"L" level fixed</td><td>Duty cycle 50% output fixed</td></tr>
</table></td></tr>
<tr><td>15</td><td>4/1</td><td>Input</td><td>This pin selects either one or four pulses for each revolution of the disc motor, set by the FGIN input pulse.
<table>
<tr><th>FG pulse</th><th>4/1</th></tr>
<tr><td>1</td><td>"H" level</td></tr>
<tr><td>4</td><td>"L" level</td></tr>
</table></td></tr>
<tr><td>16</td><td>OVRG</td><td>Input</td><td>This pin decides whether or not to control the disc motor revolutions with FGIN input.
The FGIN input becomes active at "H" level</td></tr>
<tr><td>17</td><td>APCG</td><td>Input</td><td>ON/OFF switch for the generator which generates CLV servo control APC signals.
It turns OFF at "L" level and ON at "H" level.</td></tr>
<tr><td>18</td><td>DMLD</td><td>Output</td><td>Lock detection output pin located on the CLV servo control AFC signal generator. "H" level when the lock.</td></tr>
<tr><td>19</td><td>APCO</td><td>Output</td><td>CLV servo control APC signal output pin.</td></tr>
<tr><td>20</td><td>AFCO</td><td>Output</td><td>CLV servo control AFC signal output pin.</td></tr>
<tr><td>21</td><td>P/$\overline{S}$</td><td>Input</td><td>CLV servo control signal ON/OFF switch.
"H" level while playing, "L" level while being stopped.</td></tr>
<tr><td>22</td><td>SCSE</td><td>Input</td><td>For selecting data for sub-code signal output pins SCP/T to S/W4.
Each outputs four-bit data. At "L" level, P, Q, R and S; and at "H" level, T, U, V and W.</td></tr>
<tr><td>23</td><td>SCPT</td><td>Output</td><td rowspan="4">Sub-code signal P, Q, R, S, T, U, V, W, eight-bits data output pin.
This signal is data for each frame and is always output in four-bit units by the SCSE signal.</td></tr>
<tr><td>24</td><td>SCQU</td><td>Output</td></tr>
<tr><td>25</td><td>SCRV</td><td>Output</td></tr>
<tr><td>26</td><td>SCSW</td><td>Output</td></tr>
<tr><td>27, 61</td><td>VDD</td><td></td><td>Voltage supply (+5 V)</td></tr>
<tr><td>28</td><td>VSS</td><td></td><td>GND</td></tr>
<tr><td>29</td><td>SOS I</td><td>Output</td><td>This pin becomes "H" level when either sub-code synchronized pattern SO or SI is detected, for duration of that input frame period.</td></tr>
<tr><td>30</td><td>N. C</td><td></td><td></td></tr>
<tr><td>31</td><td>PFCK</td><td>Output</td><td>The frame period duty cycle is approx 50% output.
The sub-code data changes to synchronize with the output trailing edge.</td></tr>
<tr><td>32</td><td>QDSS</td><td>Input</td><td>This pin selects the sub-code synchronized pattern detection mode which is used in demodulating the sub-code signal Q.</td></tr>
<tr><td>33
~
36</td><td>N. C
~
N. C</td><td></td><td></td></tr>
<tr><td>37</td><td>QDAS</td><td>Input</td><td>This pin switches the data of the sub-code signal Q data output pin. Fixed to "L" level.</td></tr>
<tr><td>38
~
41</td><td>N. C
~
N. C</td><td></td><td></td></tr>
</table>

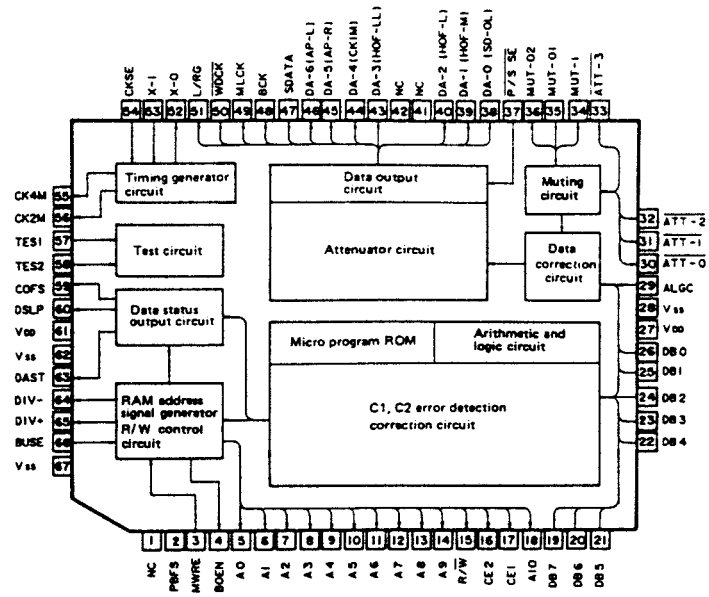
<table>
<tr><th>Pin</th><th>Pin name</th><th>I/O</th><th>Function</th></tr>
<tr><td>42</td><td>WSEG</td><td>Input</td><td>This signal is a gate signal window selection pin that determines whether or not to give out an internal synchronized signal when an EFM signal frame synchronize pattern has been detected.
<table>
<tr><th>WSEG</th><th>Gate signal window (PLCK clock number)</th></tr>
<tr><td>L</td><td>± 3</td></tr>
<tr><td>H</td><td>± 7</td></tr>
</table></td></tr>
<tr><td>43</td><td>TMWS</td><td>Input</td><td>
<table>
<tr><th>TMWS</th><th>N(PLCK)</th></tr>
<tr><td>H</td><td>11 ± 0.5</td></tr>
</table></td></tr>
<tr><td>44</td><td>ESGM</td><td>Input</td><td rowspan="2">
<table>
<tr><th>ESGL</th><th>ESGM</th><th>N(Frame)</th></tr>
<tr><td>H</td><td>H</td><td>2</td></tr>
</table></td></tr>
<tr><td>45</td><td>ESGL</td><td>Input</td></tr>
<tr><td>46</td><td>TMGS</td><td></td><td>
<table>
<tr><th>TMGS</th><th>N</th></tr>
<tr><td>L</td><td>7</td></tr>
</table></td></tr>
<tr><td>47</td><td>N. C</td><td></td><td></td></tr>
<tr><td>48</td><td>TMO</td><td>Output</td><td>This pin outputs, in three states, the result of comparison between the maximum cycle (Tmax) of the DEFM signal and the PLCK frequency.
When "L," f (DEFM) ‹ f (PLCK). When "H," f (DEFM) › F (PLCK).
The P/$\overline{S}$ signal at "L" forces TMO to become fixed at the "H" level.</td></tr>
<tr><td>49</td><td>QDSE</td><td>Input</td><td>Effective use of the micro computer input port can be made with this pin.
It becomes high impedance at the "L" level.</td></tr>
<tr><td>50</td><td>TMOE</td><td>Input</td><td>Forces TMO output to becomes high impedance. It becomes high impedance at the "L" level.</td></tr>
<tr><td>51</td><td>FSPS</td><td>Output</td><td>Displays the system synchronization state with the frame synchronize pattern.</td></tr>
<tr><td>52</td><td>DEFM</td><td>Input</td><td>This is the input pin for the EFM signal reproduced from the disc.
The signal from the RF amplifier is sliced by the level comparator and input directly (asynchronous with PLCK) to this pin.</td></tr>
<tr><td>53</td><td>EFMI</td><td>Input</td><td>Input pin for the EFM signal reproduced from the disc.
Inputs a signal synchronized with the PLCK leading edge which is phase-locked by the PLL circuit.</td></tr>
<tr><td>54</td><td>PLCK</td><td>Input</td><td>Input pin for the clock pulse for separating the frame synchronisation signal and data. Theclock pulse generated by an external PLL circuit using the HF signal reproduced from the disc.
System lock: 4.3218 MHz, Duty cycle = 50%.</td></tr>
<tr><td>55</td><td>FSLO</td><td>Output</td><td>Not in use.</td></tr>
<tr><td>56</td><td>PBFS</td><td>Output</td><td>When each frame period signal is "H" level, the demodulated data UO to U31 are transferred to TC9179F
The first MWRE signal that has been output after this pin becomes "H" level indicates thatsymbol UO can be output.</td></tr>
<tr><td>57
⌇
60
•
62
⌇
65</td><td>DB0
⌇
DB3
•
DB4
⌇
DB7</td><td>Output
⌇
Output

Output
⌇
Output</td><td>Pins for outputting the demodulated data (UO to U31) for each frame.
This is a three-state output. When the BOEN input is "L" level, data is output.</td></tr>
<tr><td>66</td><td>BOEN</td><td>Input</td><td>This is an enable signal input pin which turns on DB0 to DB7 (bus driver) .</td></tr>
<tr><td>67</td><td>MWRE</td><td>Output</td><td>This signal output pin indicates whether or not it is possible to write DB0 to DB7 output into the external RAM.</td></tr>
</table>

*IC5 : HM6116ASP-20


Vcc A7 A6 R/W OE A2 CS DB7 DB6 DB5 DB4 DB3
24 23 22 21 20 19 18 17 16 15 14 13
MEMORY MATRIX
128 x 128
ROW DECODER
COLUMN I/O
COLUMN DECODER
INPUT DATA CONTROL
1 2 3 4 5 6 7 8 9 10 11 12
A10 A9 A8 A5 A4 A3 A1 A0 DB2 DB1 DB0 GND

* IC6 : TC9179F


CKSE X-I X-O L/RG WDCK MLCK BCK SDATA DA-6(AP-L) DA-5(AP-R) DA-4(CKIM) DA-3(HOF-LL) NC NC DA-2 (HOF-L) DA-1 (HOF-M) DA-0 (SO-OL) P/S SE MUT-02 MUT-01 MUT-I ATT-3
64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33
Timing generator circuit
Test circuit
Data status output circuit
RAM address signal generator R/W control circuit
Data output circuit
Attenuator circuit
Muting circuit
Data correction circuit
Micro program ROM
Arithmetic and logic circuit
C1, C2 error detection correction circuit
CK4M CK2M TES1 TES2 COFS DSLP Vss Vss DAST DIV- DIV+ BUSE Vss
ATT-2 ATT-1 ATT-0 ALGC Vss Vdd DB0 DB1 DB2 DB3 DB4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
NC PBFS MWRE BOEN A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 R/W CE2 CE1 A10 DB7 DB6 DB5

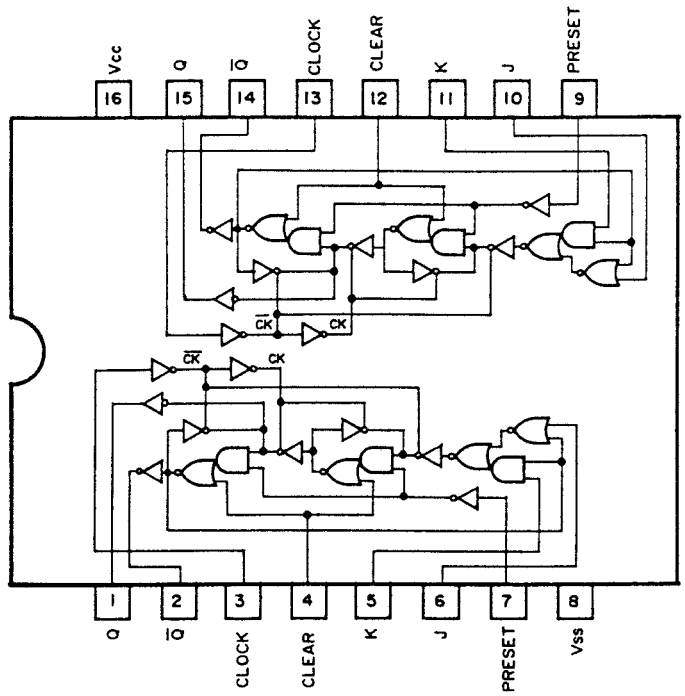
TC9179F Pin Function Description

CD system DAD error detection correction signal processor LSI

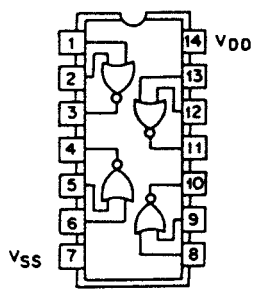
Pin	Pin name	I/O	Function
1	N. C		
2	PBFS	Input	Frame synchronized input.
3	MWRE	Input	Memory write request input.
4	BOEN	Output	Output enable pin. This is a control signal output pin that enables the symbol data output pins (DB0 to DB7) when it has become possible to receive the MWRE signal from TC9179F.
5 ~ 14	A0 ~ A9	Output	RAM address signal. External RAM (eight bits x 2 kW) address control signal output.
18	A10	Output	
15	R/$\overline{W}$	Output	Read/write signal pin. Controls the external read/write. Read at "H" level, Write at "L" level.
16	CE2	Output	Chip enable pin, Becomes "H" when correction data is written into an external RAM during C2 correction. (Not in use.)
17	CE1	I/O	Chip enable pin for reading/writing external RAM.
19 ~ 26	DB7 ~ DB0	I/O	Data bus line. I/O pin which sends data to the external RAM or TC9178F.
27,	VDD		Power supply (+5 V)
28 ~ 62 ~ 67	VSS VSS VSS		GND

Pin	Pin name	I/O	Function
29	ALGC	Input	Fixed to "L" in this product.
30 ∫ 33	ATTO ∫ ATT3	I/O I/O	Internal digital attenuator level monitor and external control pin.
34	$\overline{MUT1}$	Input	Muting control. At "L" level, the attenuation quantity increases, and at "H" level the attenuator quantity decreases.
35	$\overline{MUTO1}$	Output	When a burst error of 64 frames or more, or the jitter absorption memory buffer over is detected, "L" level is output.
36	$\overline{MUTO2}$	Output	"L" level is output when three frames of de-interleave error is detected.
37	P/S SE	Input	Output data parallel/serial selection. Parallel output at "L" level, and serial output at "H" level.
38 ∫ 46	DA0 ∫ DA6	Output Output	(Not in use.)
47	SDATA	Output	When pin 37 is "L" level, it outputs an eight-bit data starting from the MSB. When pin 37 is "H" level, it outputs serial data starting from the MSB.
48	BCK	Output	Bit clock output pin. Serial data is output in synchronization with the clocks trailing edge. (1.4112 MHz)
49	MLCK	Output	MSB/LSB clock output pin. The clock output is 1/8 the frequency of BCK and is used to set the clock when outputting eight-bits parallel data. (176.4 KHz)
50	$\overline{WDCK}$	Output	Word clock output pin. The clock output is 1/16 the frequency of BCK and indicates the output period of one word. (88.2 kHz)
51	L/RG	Output	Sampling frequency output pin. The clock output is 1/2 the frequency of $\overline{WDCK}$ and indicates the data output Lch/Rch. (44.1kHz) "L" level is Lch, and "H" level is Rch.
52	X-0	Output	Crystal oscillator connector pin. (8.4672 MHz)
53	X-1	Input	
54	CKSE	Input	Clock select pin. It selects the frequency of the crystal oscillator. At "H" level or when open it's 8.4672 MHz, and at "L" level, it's 4.2336 MHz.
55	CK4M	Output	4 MHz clock output pin. (Not in use.)
56	CK2M	Output	2 MHz clock output pin. (2.1168 MHz) Used as TC9178F clock output.
57	TESI	Input	Test pin. Normally "H" level or open.
58	TES2		
59	COFS	Output	Frame period output pin. Correction frame period output.
60	DSLP	Output	Data status latch output pin.
63	DAST	Output	Data status output pin. Outputs the contents of the results of the jitter absorption memory and the C1, C2 error detection in the form of bit serial output.
64	DIV−	Output	Buffer amplifier output pin. It outputs "H" level when the jitter absorption memory buffer capacity ±4 frames reaches +2 or +3 frames. This output connects to TC9178F (DIV−) and reduces the disc motor revolutions (rpm).
65	DIV+	Output	Buffer down output pin. It outputs "H" level when the jitter absorption memory buffer capacity ±4 frames reaches −2 or −3 frames. This output connects to TC9178F (DIV+) and increases the disc motor revolutions (rpm).
66	BUSE	Input	Buffer select input pin. It selects the output conditions for DIV-/DIV+. Its output range at "H" level is ± 2 and at "L" level ±3 frames.

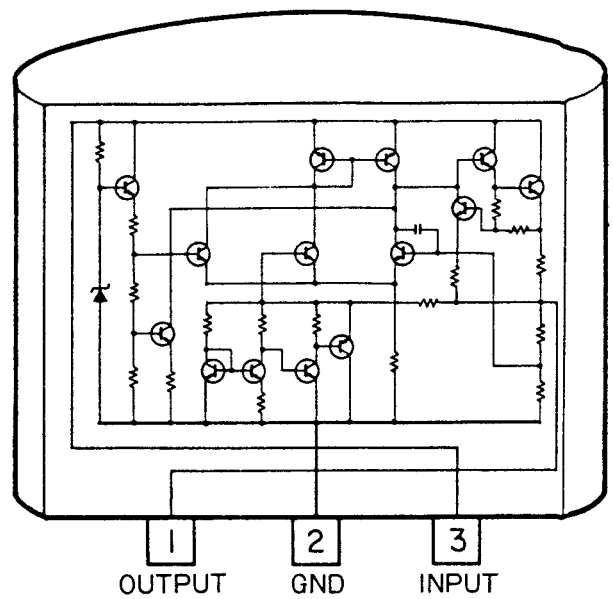
*IC8 : TC4027BP



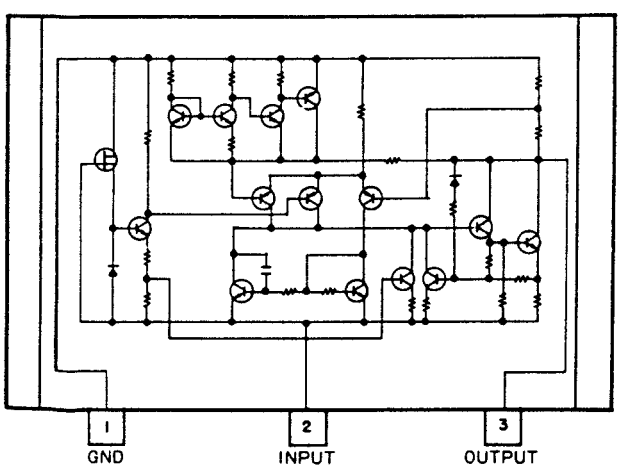
IC9 : TC4001BP



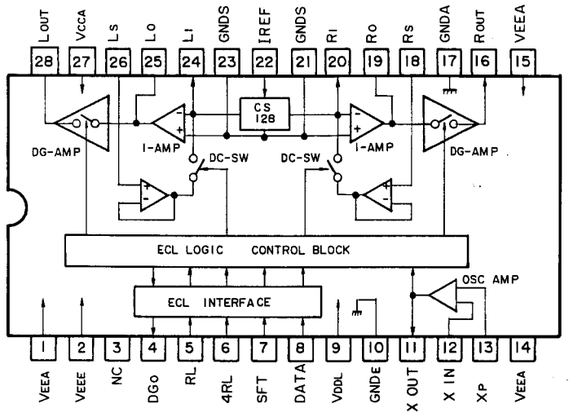
IC10 : NJM78L08A



IC11 : NJM79L09A



IC12 : TD6705AP

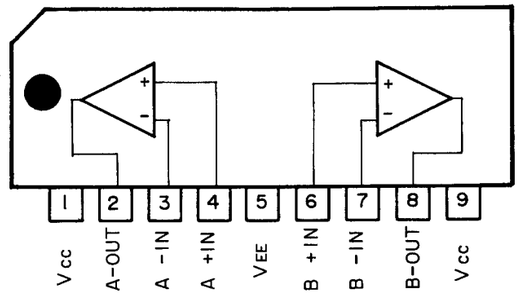


TD6705AP Pin Functions

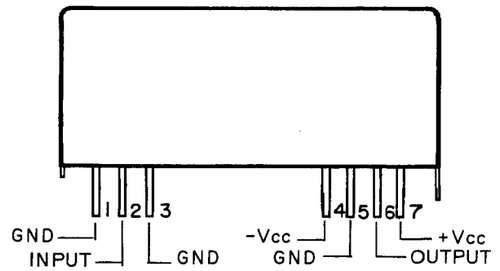
Pin	Pin name	I/O	Function
1	VEEA		Analog power supply (−9 V).
14	VEEA		
15	VEEA		
2	VEEE		Digital power supply (−5 V).
3	N. C		Digital GND
4	DGO		Not in use
5	RL	Input	Input data L, R channels indicator signal input. (44.1 kHz) Duty cycle = 50%. The "L" level is Lch, and the "H" level is Rch, and is used as a control signal within the LSI.
6	4RL	Input	This input pin quadruples the RL (44.1KHz) frequency. (176.4 kHz) Duty cycle = 50%. Used as a control signal within the LSI.
7	SFT	Input	This is a shift clock input pin which reads the PCM digital audio data in 16 bits units from the MSB side bit serial, into the LSI. (1.4112 MHz) Duty cucle = 50%.
8	DATA	Input	PCM digital audio data input. Inputs from MSB in 16-bits units in bit serial.
9	VCC		Digital voltage supply. (+5 V)
10	GNDE		Digital GND
11	X OUT	Output	Generator circuit I/O pin. By joining L, C, and R, it makes up a modified Colpitts oscillator circuit.
12	X IN	Input	
13	X P		
16	R OUT	Output	Internal Deglitcher amplifier output pin. (Rch and Lch) It outputs the Rch and Lch integrator hold voltage by means of a 44.1kHz, PAM wave with a dury cycle of 50%.
28	L OUT	Output	
17	GNDA		Analog GND.
18	RS	Input	This is a discharge amplifier input pin inside the LSI. (Rch and Lch)
26	LS	Input	

Pin	Pin name	I/O	Function
19	RO	Input	Deglicher amplifier input pin (Operational amplifier output point)
25	LO	Input	
20	RI	Input	Operational amplifier inverted (—) input pin. This pin is also used to connect a constant current source and an analog switch.
24	LI	Input	current source and built-in analog switch. (Rch and Lch)
21	GNDS		Analog GND.
23	GNDS		
22	IREF	Input	Standard current input pin for setting a constant current.
27	VCC		Analog voltage supply. (+8 V)

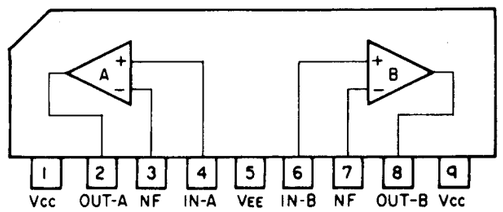
IC13 : NJM072S



IC14, IC15, CWW-225



IC16, IC17 : TA75558S



9. SCHEMATIC DIAGRAM & P.C. BOARD PATTERNS

9.1 OVERALL CONNECTIONS DIAGRAM

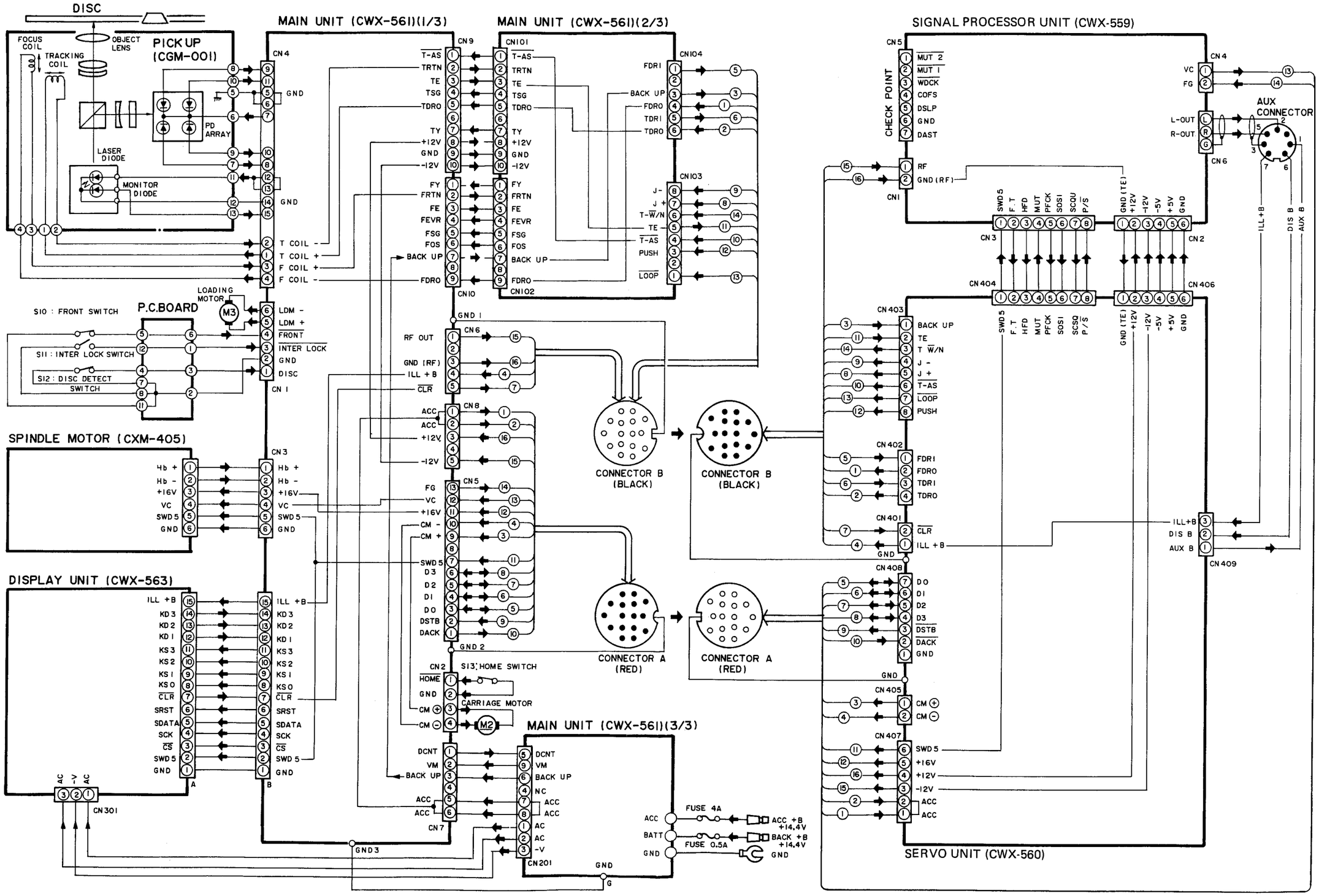


Fig. 59

• Circuit Diagram Abbreviations

Abbreviation	Detail	Purpose	Connector line stage	Comments
ACC	ACCESSORY	Main power supply	14.4V	
AUX B	AUX +B	Informs that DC operation is in progress. +B OUTPUT	14.2V	Output from AUX connector pin 5.
CLR	CLEAR	Reset input for external IC2 (PD3023A)	7V / 0V ⊓ 30ms "L"	Output from the clear key (S9).
COFS	CORRECTION FRAME SYNC	Correction frame synchronise output	Photo 1	External monitor, IC6 (TC9179F) pin 59.
CM	CARRIAGE MOTOR	Pickup unit carriage motor	Changes at about CM⊕ 7V and CM⊖ 6V	
CS	CHIP SELECT	Activates the display driver (PD7005)	Photo 2	IC6 (PD6029) pin 34 → IC301 (PD7005) pin 9.
D	DATA (D0 ~ D3)	Data from the system controller (PD3023A)	Photo 3	IC2 (PD3023A) ┬ IC3 (PD8010) └ IC6 (PD6029)
DACK	DATA ACKNOWLEDGE	Acknowledges receipt of data output by IC6 (PD6029)	Photo 4	PD6029 pin 36 → PD3023A pin 24
DAST	DATA STATUS	Outputs data status output, jitter absorption memory and the error detection results of C1 and C2 in bit serial.	Photo 5	External monitor IC6(TC9179F) pin 63
DCNT	DC-DC CONVERTER CONTROL	Display power supply drive output. (Turns on the ACC assemblyDC-DC converter.)	5V / 0V ON / OFF	IC6 (PD6029) pin 6 "L" level, DCNT is "H" level.
DIS B	DISABLE +B	A +B for externally stopping the CD operation.	14.2V	Input from AUX connector pin 6.
DSLP	DATA STATUS LATCH PALUS	Data status latch signal output.	Photo 6	External monitor IC6(TC9179F) pin 60.
DSTB	DATA STROBE	The system controller (IC2: PD3023A) using this signal, informs IC6 that the data on data bus DO to D3 is valid, prompting IC6 to receive the data.	Photo 4	PD3023A pin 25 → PD6029 pin 23.
FDRI	FOCUS DRIVER INPUT	Input to the focus actuator and the driver.	Photo 7	Servo unit Q38 and Q39 input.
FDRO	FOCUS DRIVER OUTPUT	Focus actuator and driver output.	Photo 8	Servo unit Q38 and Q39 output.
FE	FOCUS ERROR	Focus error detection signal.	Photo 9	
FEVR	FOCUS ERROR VR OUTPUT	Monitor output controlled with the focus error signal volume.		
FG	FREQUENCY GENERATOR	Pulse output in proportion to the spindle motor rpms. (For detecting uncontrolled rotation of the motor.)	Photo 10	
FOS	FOCUS OFFSET	Focus offset standard voltage.	Approximately −1.8 V	
FRONT	FRONT	Detects whether or not the disc unit plate is in front. (Detects eject completion.)	5V / 0V "L" EJECT	Operated with front SW (S10).
FRTN	FOCUS RETURN	Focus actuator return voltage.	See adjustment methods.	
FSG	FOCUS SG INPUT	Input pin for the oscillator when adjusting the servo gain.	——	
FT	FOCUS TRIGGER	Detects focal point and monitors the focus system operations.	5V / 0V Normally "H"	OUTPUT from IC1 (KHA301) pin 25 → IC2(PD3023A) pin 16, IC3(PD8010)pin 9
FY	FOCUS Y OUTPUT	Connecting pin for phase meter during focus servo gain adjustment.	——	
HFD	HIGHT FREQUENCY DETECTOR	Detected RF signal	5V / 0V There is an "H" RF signal	Output from IC1 (KHA301) pin 24 ——→ IC3 (PD8010) pin 10

Abbreviation	Detail	Purpose	Condition on the connector line	Comments
HOME	HOME	Detects whether or not the pickup is at home position.	5V / 0V "L" home position.	By means of HOME SW (S13) → IC6 (PD6029) pin 4.
ILL	ILLUMINATION	Night illumination power supply	14.4V	
J	JUMP (J+, J–)	Drives the lens toward the center of the disc during pickup jumps.	J+ J– (Toward record center) J+ J– (Toward record outside edge)	Output from IC3 (PD8010) pin 19 and 20.
KD	KEY DATA (KD1 ~ KD3, KS0 ~ KS3)	Data for each key input.	KD1 to KD3 are normally "H" level. KSO to KS3 are normally "L" level. Data is entered at the time of key input. Photo 11.	
LDM	LOADING MORTOR	Drive motor for loading the disc into the set and then unloading it.	LDM– 0V LDM+ 6.5V loading PLAY	
LOOP	FOCUS LOOP CONTROL	Output to open and close the focus loop.	"H": open; "L": closed. Usually "L" level.	Output from IC (PD8010) pin 14.
MUT	MUTING	Inhibits output from all circuits	"L": MUT ON	
PFCK	PLAY BACK FRAME SYNC CLOCK	Signal output for whether or not the sub-code is being read normally.	Photo 12 Duty ratio 50%	IC4 (TC9178F) pin 31 → IC3 (PD3023A) pin 39.
P/$\overline{S}$	PLAY/STOP	Drives and stops the spindle motor.	"H": drive; "L": stop.	IC (PD3023A) pin 20 → IC4 (TC9178F) pin 21.
PUSH	PUSH	Signal for pushing out and bringing in the object lens during focus signal control.	At "L" the lens is drawn in. It's normally "L" level.	Output from IC3 (PD8010) pin 13.
RF OUT	RF OUT	RF signal output	Photo 13	From the player section to the signal processor.
SCQU	SUB CODE Q & U	Sub-code Q channel input pin.	Photo 15	IC4 (TC9178F) pin 24 → IC2 (PD3023A) pin 31.
SOS 1	SUB CODE SYNCH S0 AND S1	Sub-code synchronize pattern input pin.	Photo 14	IC4 (TC9178F) pin 27 → IC2 (PD3023A) pin 30.
SWD5	SWITCHED 5 VOLTS	Power supplied to other ICs with commands from the system controller.	5V	The SWD5 line goes on when IC2 (PD3023A) pin 11 is "H" level.
T-AS	TRACKING ANALOG SWITCH	For opening and closing the tracking servo loop.	Closed at "L." Normally "L."	Output from IC3 (PD8010) pin 18.
TDRI	TRACKING DRIVER INPUT	Tracking actuator driver input.	Photo 16	Servo unit Q36, Q37
TDRO	TRACKING DRIVER OUTPUT	Tracking actuator driver output.	Photo 17	Servo unit Q36, Q37
TE	TRACKING ERROR	Tracking error detection signal.	Photo 18	
TRTN	TRACKING RETURN	Tracking actuator return voltage.	See adjustment methods.	
TSG	TRACKING SG INPUT	Input pin for oscillator during tracking servo gain adjustment.	———	
T-W/N	TRACKING WIDE/NARROW	Tracking servo band switch.	5V / 0V N / W Normally "H."	Output from IC2 (PD3023A) pin 22. FF, REV ≒100 ms
TY	TRACKING Y OUTPUT	Connecting pin for phase meter during tracking servo gain adjustment.	———	
VC	VOLTAGE CONTROL	Spindle motor control voltage.	RPMs are decided by one voltage less than or equal to 5 V.	
VM	VOLTAGE FOR MORTOR	loading motor driver IC7 (M54546L) power supply.	6.8V	
WDCK	WORD CLOCK	Word clock output.	Photo 19	Output from IC6 (TC9179F) pin 50 external monitor.

• Connector Line Waveforms

Photo 1 COFS [H : 50μs div / V : 0.1V/div]

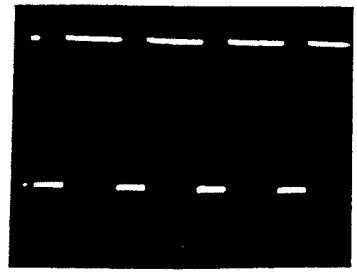


Photo 2 CS [H : 10ms/div / V : 0.1V/div]

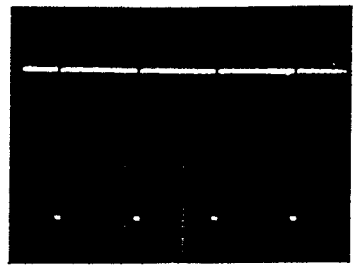


Photo 3 D0~D3 [H : 1ms/div / V : 0.1V/div]

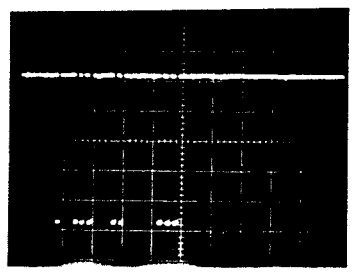


Photo 4 DACK DSTB [H : 1ms/div / V : 0.1V/div]

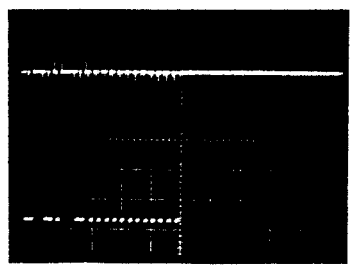


Photo 5 DAST [H : 50μs/div / V : 0.1V/div]

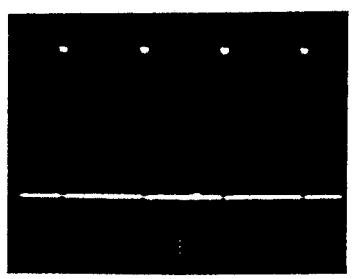


Photo 6 DSLP [H : 50μs/div / V : 0.1V/div]

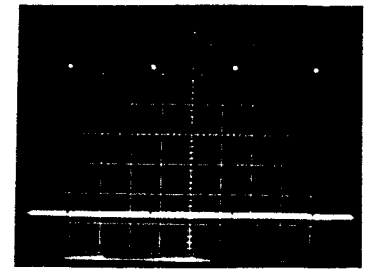


Photo 7 FDRI [H : 0.5ms/div / V : 50ms/div]

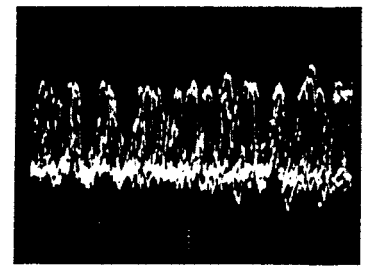


Photo 8 FDRO [H : 0.2ms/div / V : 50mV/div]

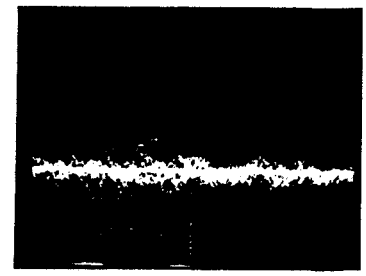


Photo 9 FE [H : 1ms/div / V : 10mV/div]

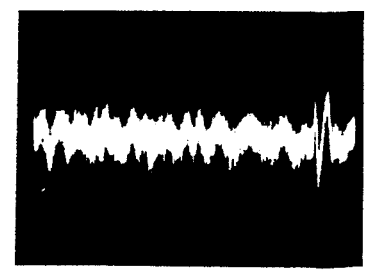


Photo 10 FG [H : 10ms/div / V : 0.1V/div]

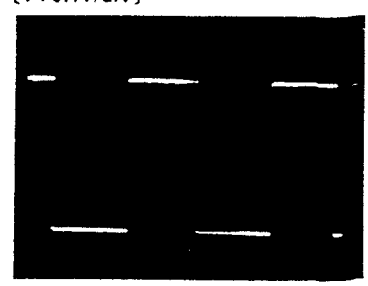


Photo 11 KDI~KD3 KS0~KS3 [H : 2ms/div V : 0.1V/div]

Photo 12 PFCK [H : 50μs/div V : 0.1V/div]

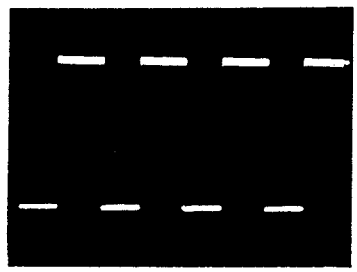


Photo 13 RF OUT [H : 0.5μs/div V : 50ms/div]

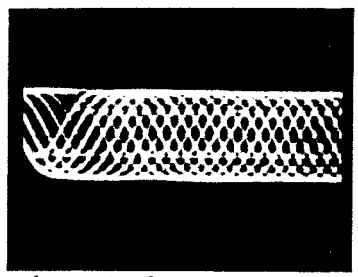


Photo 14 SOSI [H : 5ms/div V : 0.1V/div]

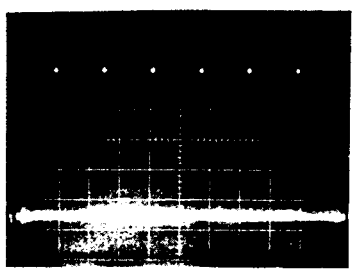


Photo 15 SCQU [H : 0.1μs/div V : 0.1V/div]

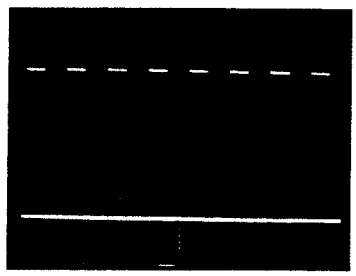


Photo 16 TDRI [H : 1ms/div V : 50ms div]

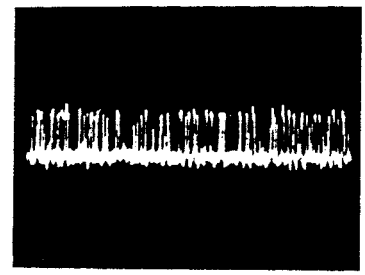


Photo 17 TDRO [H : 0.2ms/div V : 50ms/div]

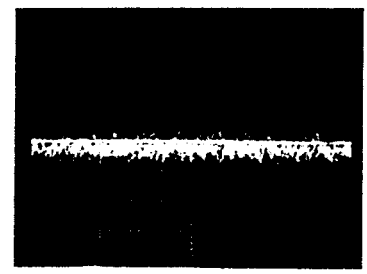


Photo 18 TE [H : 0.5ms/div V : 50mV/div]

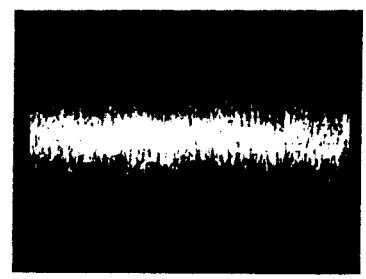
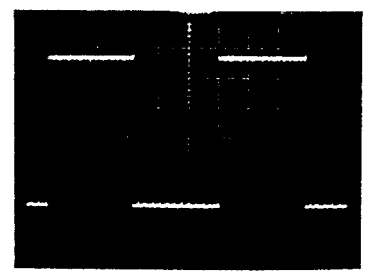


Photo 19 WDCK [H : 2μs/div V : 0.1V/div]



Note:
These waveforms were photographed during the PLAY operation and are reference values. They were measured using the 10:1 probe of the oscilloscope.

- The circuit diagram shown in Fig. 62 represent the circuits in the shaded area.

- Player Section

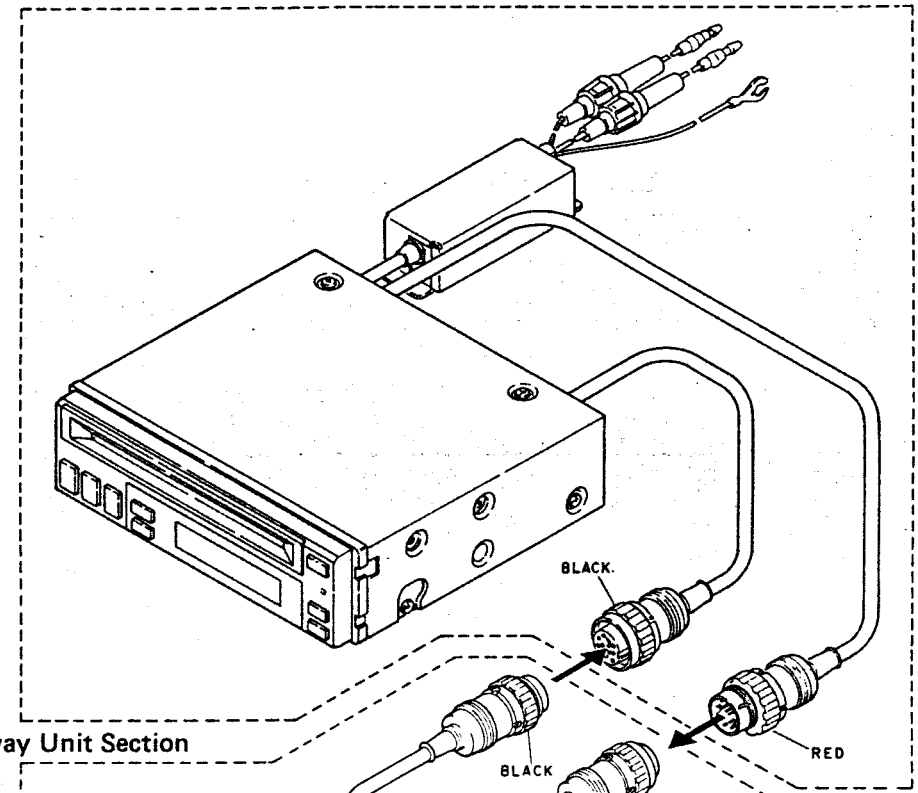


Fig. 60

- Hideaway Unit Section

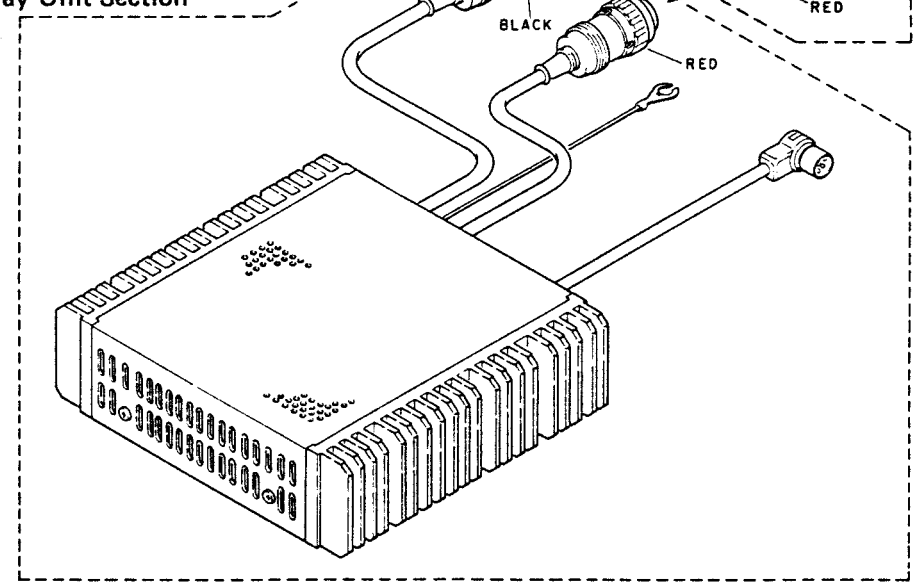
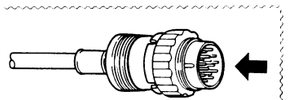


Fig. 61

9.2 SCHEMATIC DIAGRAM of PLAYER SECTION



Connection is viewed from the direction of the arrow.

NOTE :
- Indicates a chip resistor
- Indicates a chip capacitor
- Indicates a chip Diode
- Indicates a chip Transistor

I/V CONVERTER

RF signal subtraction circuit

Tracking error generator circuit

Zero Cross Detector

PICKUP (CGM-001)

MAIN UNIT (CWX-561) (1/3)

P.C. BOARD

RF Adder

APC circuit

Loading Motor drive circuit

Thermal Sens circuit

Beep oscillator circuit

Power Supply of Loading Motor

MAIN UNIT (CWX

DISPLAY UNIT (CWX-563)

ONVERTER

RF signal subtraction circuit

Tracking error generator circuit

Zero Cross Detector

MAIN UNIT (CWX-561) (1/3)

MAIN UNIT (CWX-561) (2/3)

Tracking Servo Circuit

Focus Servo Circuit

RF Adder

APC circuit

Loading Motor drive circuit

Thermal Sens circuit

Beep oscillator circuit

Power Supply of Loading Motor

MAIN UNIT (CWX-561) (3/3)

Noise Filter

Power Supply of Display

CONNECTOR A (RED)

CONNECTOR B (BLACK)

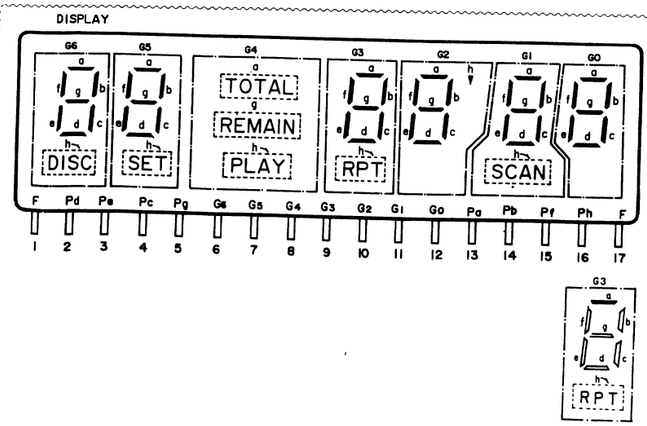
SWITCHES

◎MISCELLANEOUS

SI0	FRONT SWITCH	OPEN–CLOSE
SI1	INTER LOCK SWITCH	OPEN–CLOSE
SI2	DISC DETECT SWITCH	OPEN–CLOSE
SI3	HOME SWITCH	OPEN–CLOSE

The underlined indicates the switch position.

DISPLAY



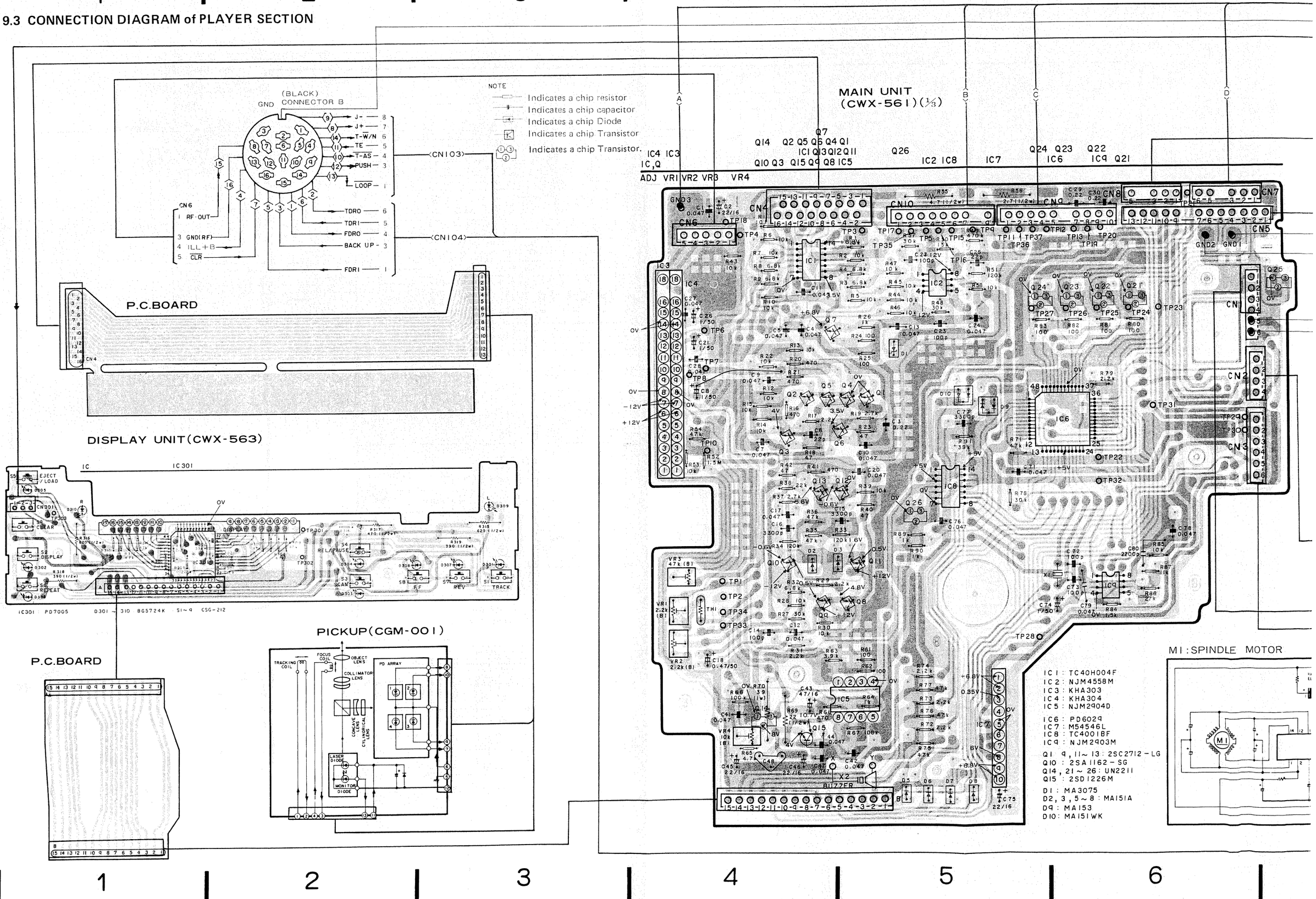
Example of Display Operation

"a" segment is illuminated when:
Pa (pin 13) and G3 (pin 9) receives a signal.

"RPT" segment is illuminated when:
Ph (pin 16) and G3 (pin 9) receives a signal.

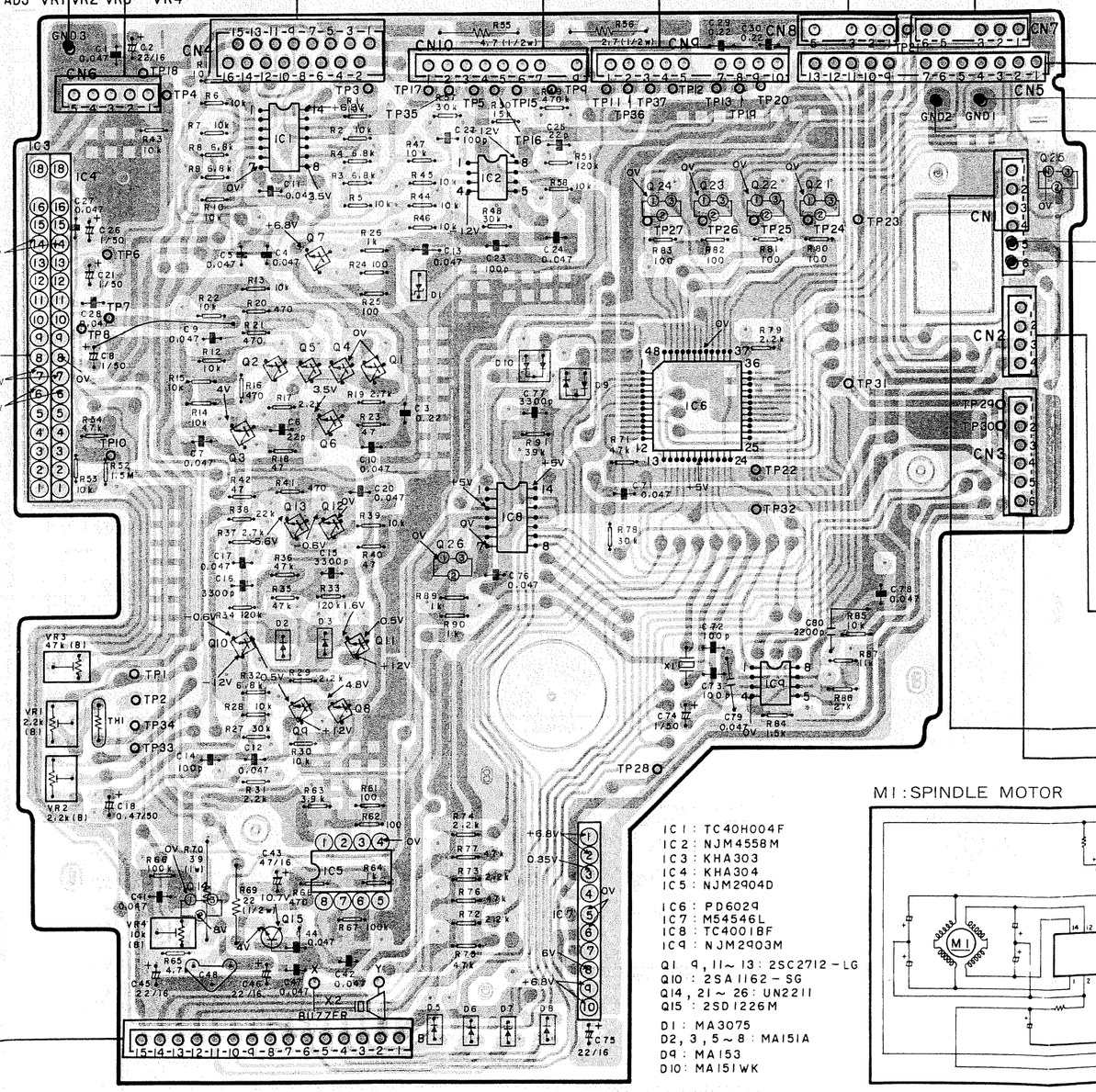
Fig. 62

9.3 CONNECTION DIAGRAM of PLAYER SECTION



chip resistor
chip capacitor
chip Diode
chip Transistor
chip Transistor.

MAIN UNIT (CWX-561)(1/3)



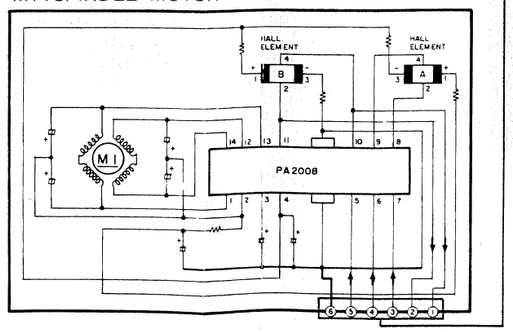
IC1 : TC40H004F
IC2 : NJM4558M
IC3 : KHA303
IC4 : KHA304
IC5 : NJM2904D

IC6 : PD6029
IC7 : M54546L
IC8 : TC4001BF
IC9 : NJM2903M

Q1 9, 11~13 : 2SC2712-LG
Q10 : 2SA1162-SG
Q14, 21~26 : UN2211
Q15 : 2SD1226M

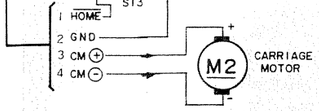
D1 : MA3075
D2, 3, 5~8 : MA151A
D9 : MA153
D10 : MA151WK

M1 : SPINDLE MOTOR



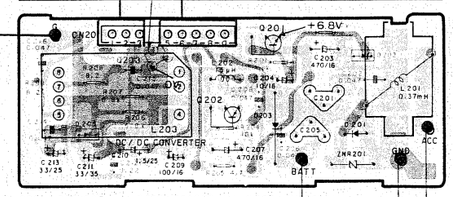
MOTOR UNIT (LOADING MOTOR)

S13 HOME SWITCH CSN-094

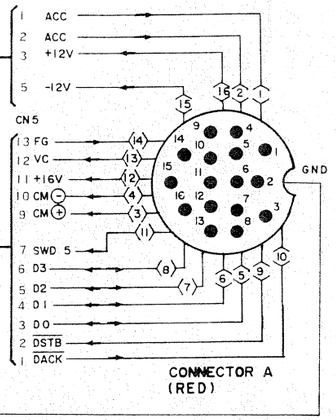


CARRIAGE MOTOR

MAIN UNIT (CWX-561)(3/3)



Q201 : 2SC1847 Q202 : 2SA683 Q203 : UN2211
D201, 203 : SI80I-02 D202, 205 : MA3075 ZNR201 : ERZ-M100K220

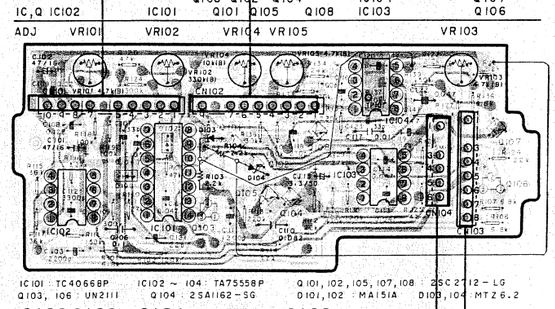


FUSE 4A — ACC +B +14.4V
FUSE 0.5A — TO BATTERY (BACK UP +B) +14.4V
GND

IC104

3	4	5	8
0V	-12V	0V	+12V

MAIN UNIT (CWX-561)(2/3)



IC101 : TC4066BP IC102 ~ 104 : TA75558P Q101, 102, 105, 107, 108 : 2SC2712-LG
Q103, 106 : UN2111 Q104 : 2SA1162-SG D101, 102 : MA151A D103, 104 : MTZ6.2

IC101

4	14
0V	+12V

IC102, IC103

4	5	8
-12V	0V	+12V

Q101, Q105, Q107

E	0V

Q103, Q106

I	+12V

Q104

B	0V

Q102

B	0V
C	0V

S12 DISC DETECT SWITCH
S10 FRONT SWITCH
S11 INTER LOCK SWITCH

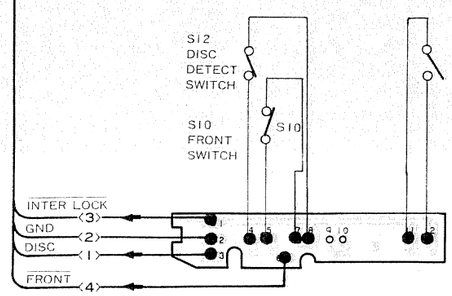
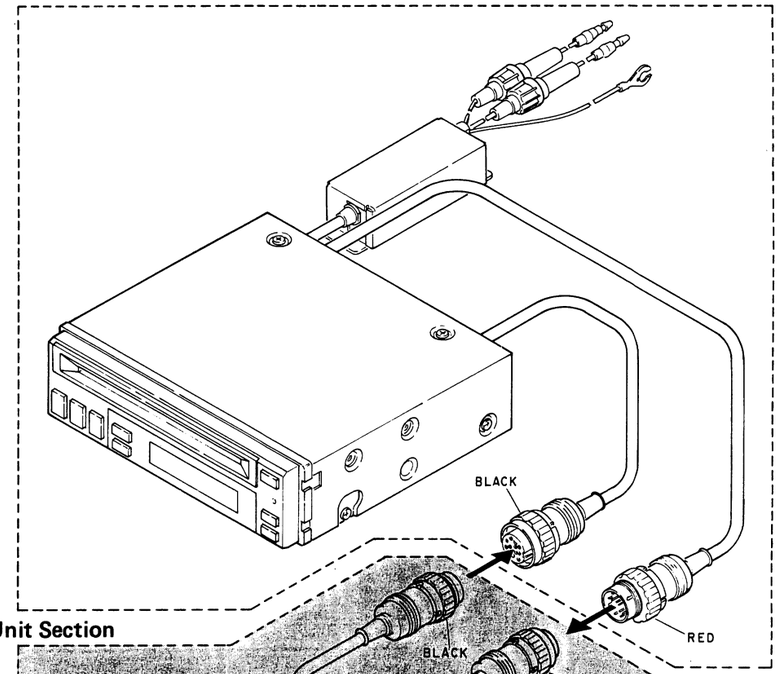


Fig. 63

- The circuit diagram shown in Fig. 66 and 68 represent the circuits in the shaded area.

- **Player Section**



- **Hideaway Unit Section**

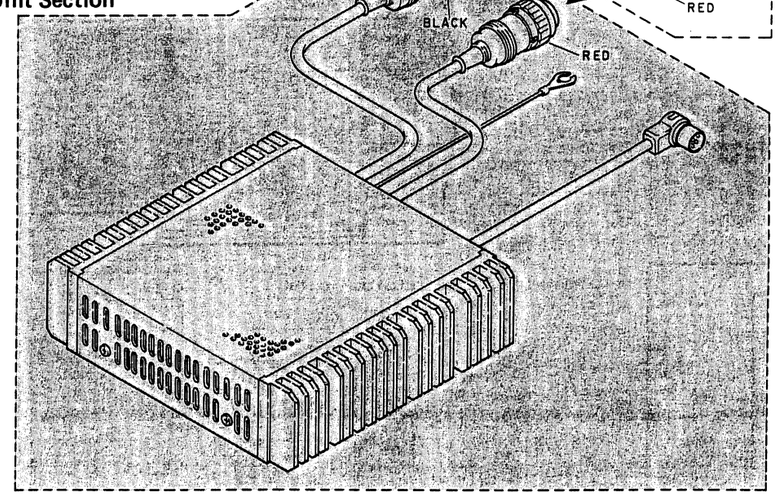
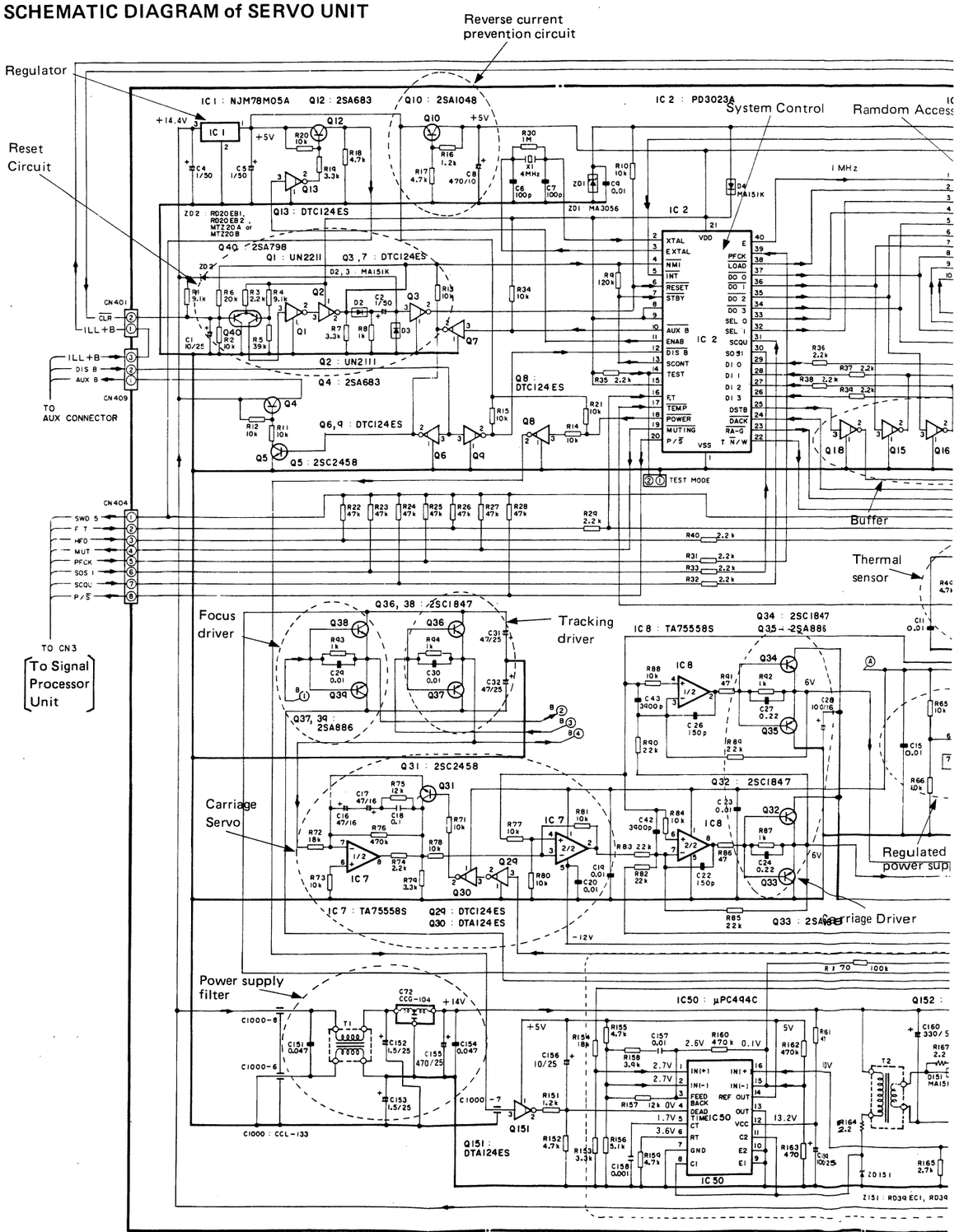


Fig. 64

Fig. 65

9.4 SCHEMATIC DIAGRAM of SERVO UNIT



9.4 SCHEMATIC DIAGRAM of SERVO UNIT

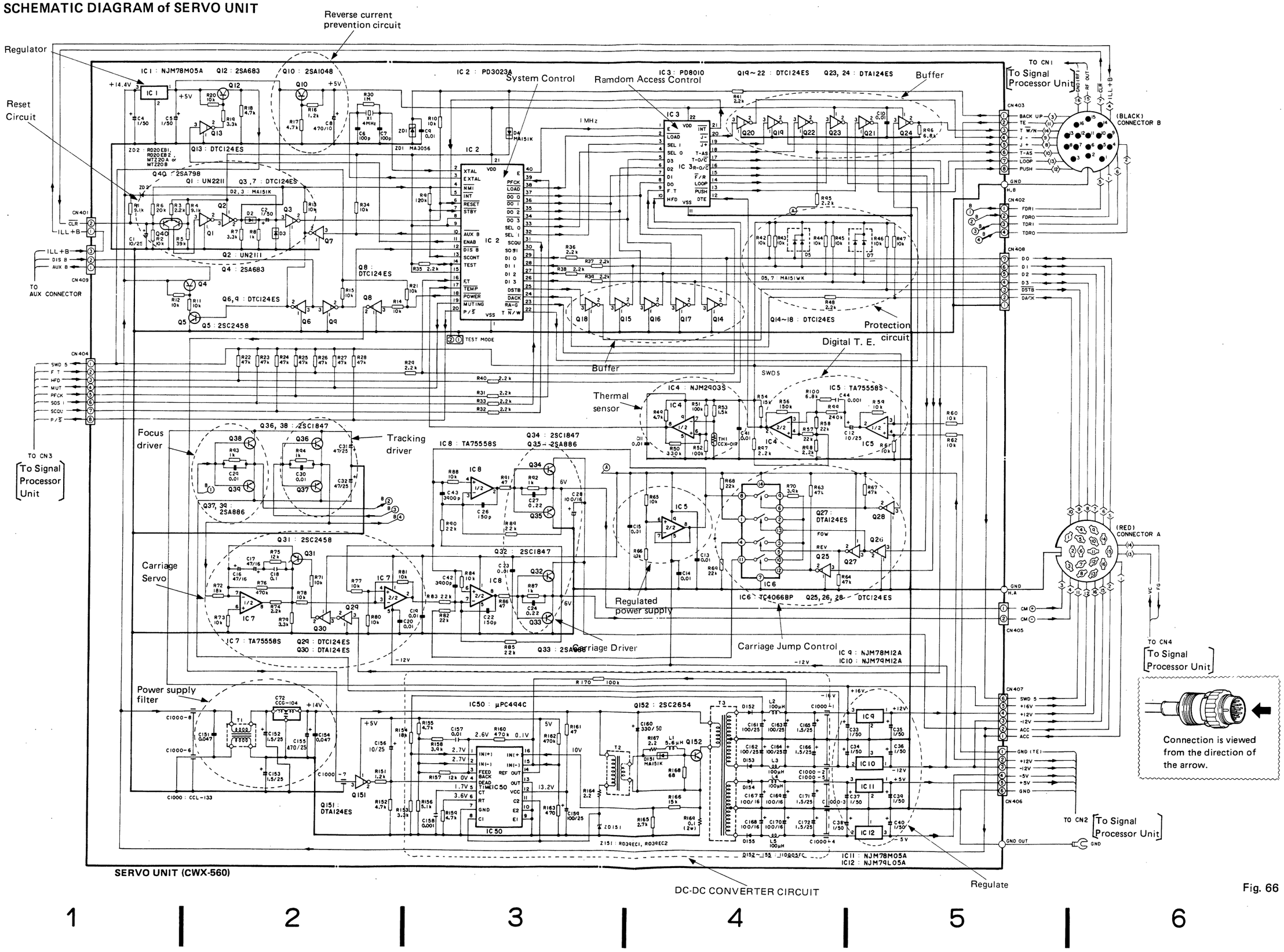
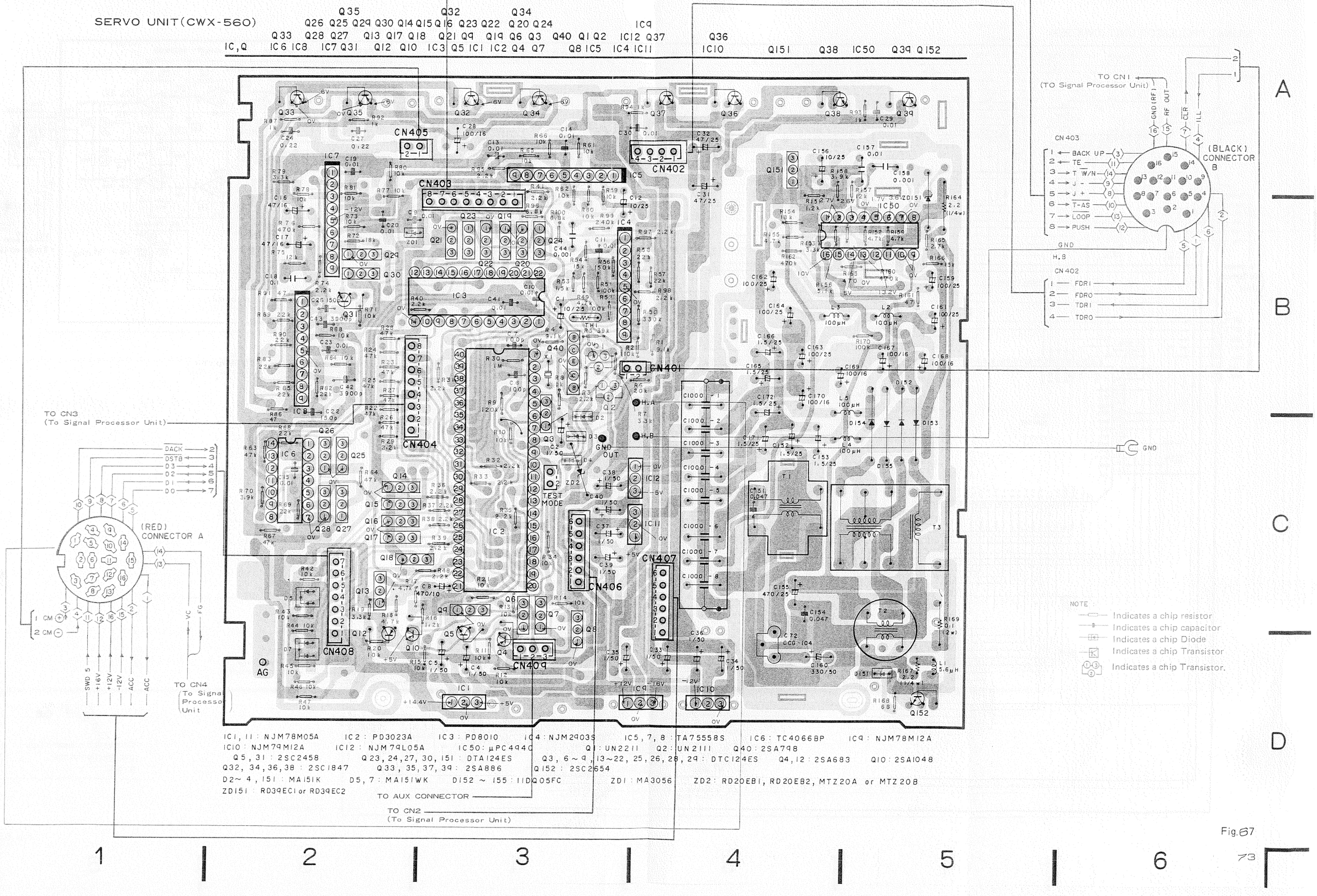


Fig. 66

9.5 CONNECTION DIAGRAM of SERVO UNIT



NOTE :
- Indicates a chip resistor
- Indicates a chip capacitor
- Indicates a chip Diode
- Indicates a chip Transistor
- Indicates a chip Transistor.

IC1, 11 : NJM78M05A IC2 : PD3023A IC3 : PD8010 IC4 : NJM2903S IC5, 7, 8 : TA75558S IC6 : TC40668P IC9 : NJM78M12A
IC10 : NJM79M12A IC12 : NJM79L05A IC50 : μPC494C Q1 : UN2211 Q2 : UN2111 Q40 : 2SA798
Q5, 31 : 2SC2458 Q23, 24, 27, 30, 151 : DTA124ES Q3, 6~9, 13~22, 25, 26, 28, 29 : DTC124ES Q4, 12 : 2SA683 Q10 : 2SA1048
Q32, 34, 36, 38 : 2SC1847 Q33, 35, 37, 39 : 2SA886 Q152 : 2SC2654
D2~4, 151 : MA151K D5, 7 : MA151WK D152~155 : 11DQ05FC ZD1 : MA3056 ZD2 : RD20EB1, RD20EB2, MTZ20A or MTZ20B
ZD151 : RD39EC1 or RD39EC2

Fig.67

9.6 SCHEMATIC DIAGRAM of SIGNAL PROCESSOR UNIT

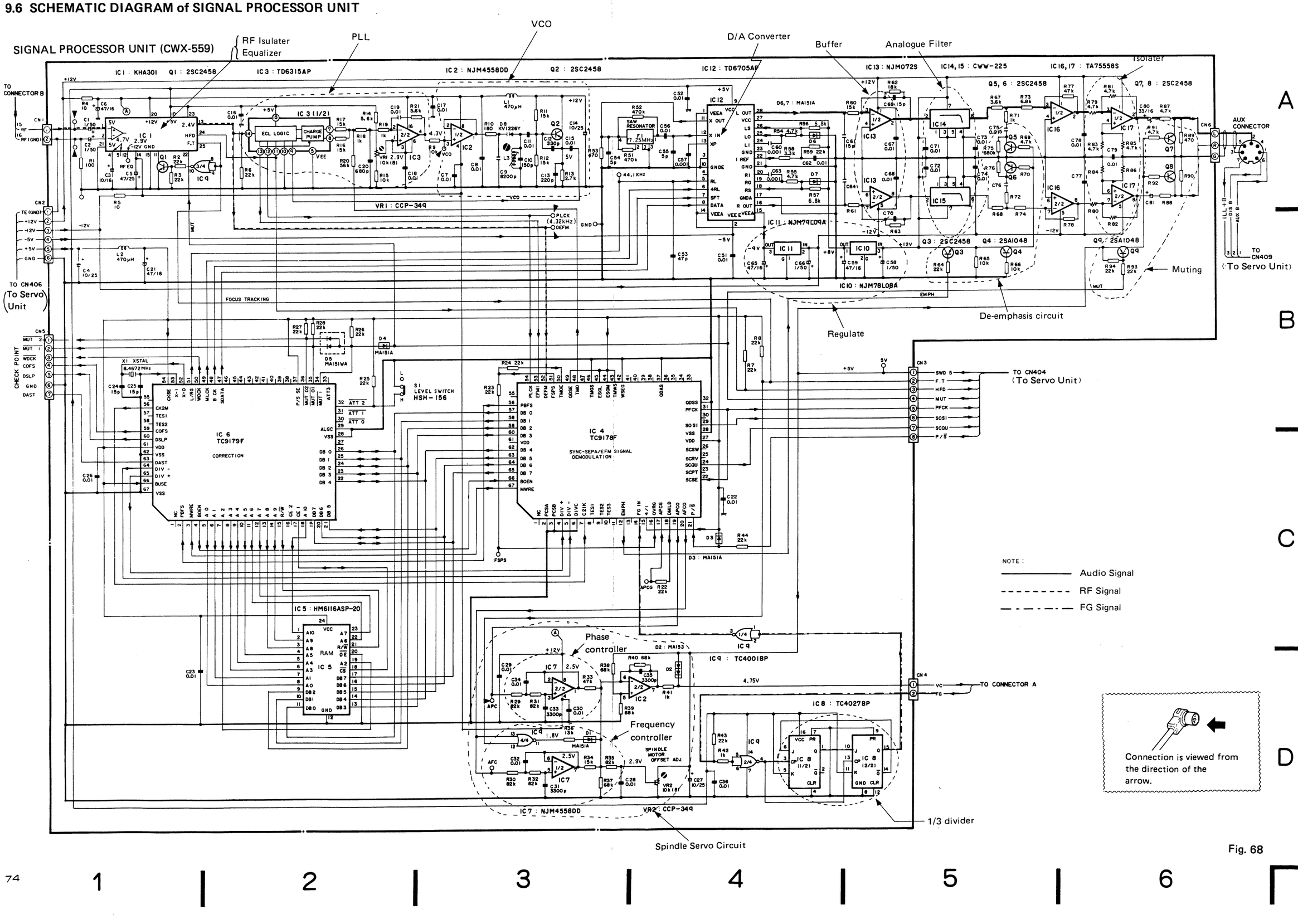
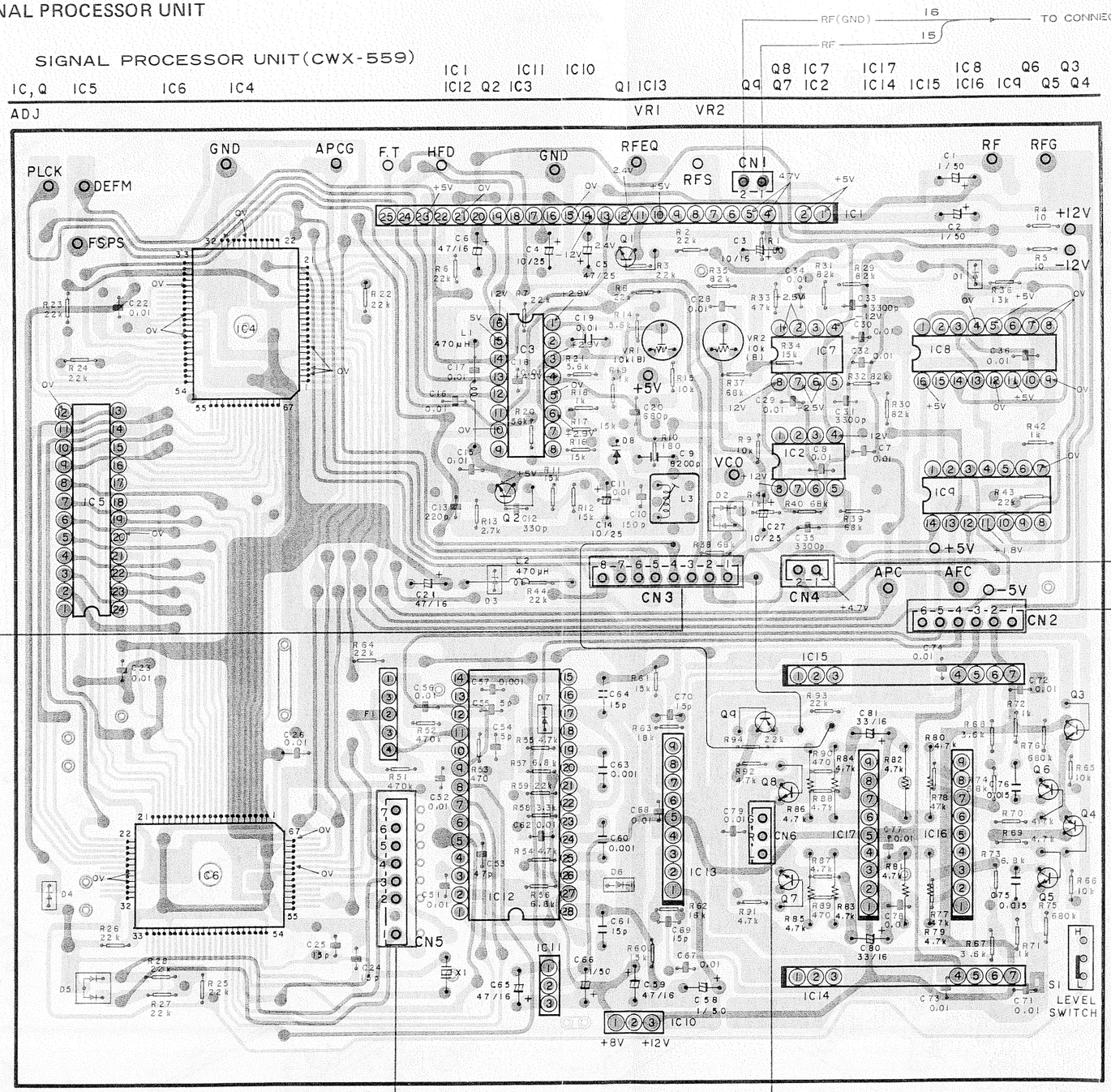


Fig. 68

9.7 CONNECTION DIAGRAM of SIGNAL PROCESSOR UNIT


SIGNAL PROCESSOR UNIT(CWX-559)
IC,Q IC5 IC6 IC4 IC1 IC11 IC10 IC12 Q2 IC3 Q1 IC13 Q9 Q8 IC7 IC17 IC8 Q6 Q3 Q7 IC2 IC14 IC15 IC16 IC9 Q5 Q4
ADJ VR1 VR2
RF(GND) 16 TO CONNECTOR B
RF 15
PLCK DEFM FSPS GND APCG F.T HFD GND RFEQ RFS CN1 RF RFG
+12V -12V
VCO +5V
APC AFC -5V
CN3 CN4 CN2
TO CN406 (To Servo Unit)
TO CN404 (To Servo Unit)
TO CONNECTOR A
VC 13
FG 14
AUX CONNECTOR
L R G
ILL DIS B AUX B
TO CN409 (To Servo Unit)
CN5 CHECK POINT
MUT 2 1
MUT 1 2
WDCK 3
COFS 4
DSLP 5
GND 6
DAST 7
+8V +12V
S1 LEVEL SWITCH

NOTE :
- Indicates a chip resistor
- Indicates a chip capacitor
- Indicates a chip Diode
- Indicates a chip Transistor
- Indicates a chip Transistor.

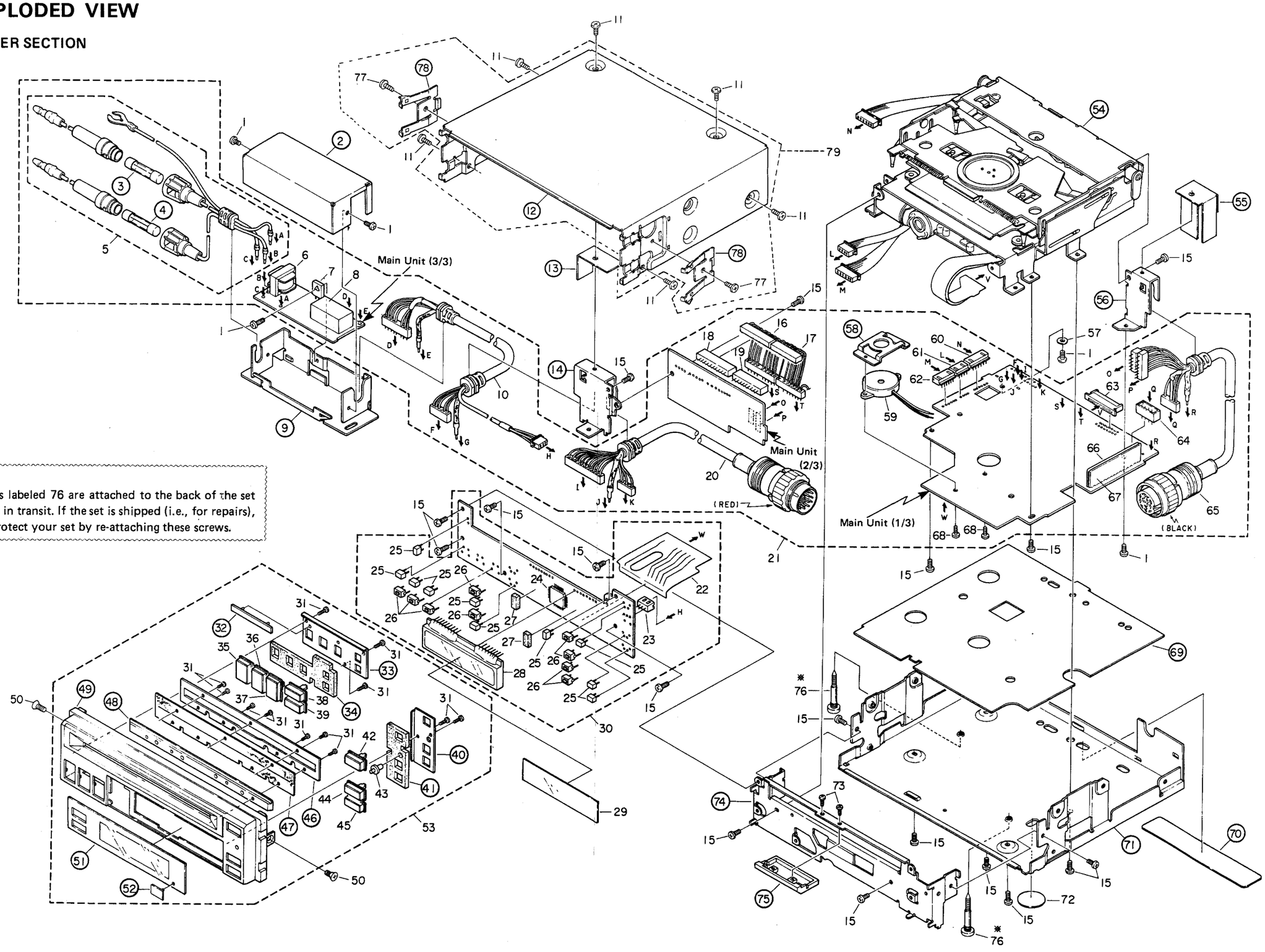
IC1 : KHA301 IC2,7 : NJM4558DD IC3 : TD6315AP IC4 : TC9178F IC5 : HM6116ASP-20 IC6 : TC9179F IC8 : TC40278P
IC9 : TC4001BP IC10 : NJM78L08A IC11 : NJM79L09A IC12 : TD6705AP IC13 : NJM072S IC14,15 : CWW-225 IC16,17 : TA75558S

Q1~3, 5~8 : 2SC2458 Q4,9 : 2SA1048
D1, 3, 4, 6, 7 : MA151A D2 : MA153 D5 : MA151WA D8 : KV1226Y

Fig. 5-9

10. EXPLODED VIEW

10.1 PLAYER SECTION



Note:
*Two screws labeled 76 are attached to the back of the set to protect it in transit. If the set is shipped (i.e., for repairs), be sure to protect your set by re-attaching these screws.

Fig. 70

• Parts List

NOTE

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ : GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	BMZ26P050FMC	Screw		41.		Cushion
	2.		Cover	★	42.	CAC-847	Button (EJECT/RELOAD)
	3.		Fuse, 0.5A	★	43.	CAA-554	Button (CLER)
	4.		Fuse, 4A	★	44.	CAA-869	Button (DISPLAY)
	5.	CDF-896	Cord	★	45.	CAC-868	Button (REPEAT)
	6.	CTF-235	Coil, 0.37 mH		46.		Holder
★★	7.	2SC1847	Transistor		47.		Cover
	8.	CTX-073	Transformer		48.		Lens
	9.		Holder		49.		Grille
	10.	CDF-895	Cord		50.	CMZ30P050FMC	Screw
	11.	CBA-121	Screw, M3 x 4		51.		Plate
	12.		Case		52.		Badge
	13.		Insulator		53.	CXD-457	Grille Assy
	14.		Holder		54.		Mechanism Assy
	15.	BMZ26P040FMC	Screw		55.		Insulator
	16.	CDF-892	Connector (9P)		56.		Holder
	17.	CDF-891	Connector (8P)		57.	WA26W060D050	Washer
	18.	CKS-574	Plug (9P)		58.		Holder
	19.	CKS-573	Plug (8P)		59.	CPV-031	Buzzer
	20.	CDF-893	Connector		60.	CKS-554	Plug (6P)
	21.	CWX-561	Main Unit		61.	CKS-470	Plug (4P)
	22.	CNL-774	P.C. Board		62.	CKS-472	Plug (6P)
	23.	CKS-567	Plug (3P)		63.	CKS-417	Connector (16P)
★★	24.	PD7005	IC		64.	CKS-569	Plug (5P)
★	25.	BG5724K	LED		65.	CDF-894	Connector
★★	26.	CSG-212	Switch	★★	66.	KHA304	IC
	27.	CNN-207	Spacer	★★	67.	KHA303	IC
★	28.	CP2131GLR	Display		68.	BMZ20P050FMC	Screw
	29.	CNN-369	Film		69.		Insulator
	30.	CWX-563	Display Unit		70.		Seal
	31.	PVZ14P045FZK	Screw		71.		Chassis
	32.		Holder		72.	CNM-153	Seal
	33.		Holder		73.	CBA-126	Screw, M2 x 4
	34.		Cushion		74.		Frame
★	35.	CAC-872	Button (TRC)		75.		Guide
★	36.	CAC-871	Button (–)		76.	CBA-154	Screw
★	37.	CAC-870	Button (+)		77.	BMZ30P030FZK	Screw
★	38.	CAC-848	Button (REL/PAUSE)		78.		Spring
★	39.	CAC-867	Button (SCAN)		79.	CXD-662	Case Unit
	40.		Holder				

10.2 HIDEAWAY UNIT SECTION

NOTE:

- *For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*

● Parts List

Mark	No.	Part No.	Description
	1.	BMN30P080FZK	Screw
	2.	CNB-832	Case
	3.	CMZ30P100FZK	Screw
	4.	CNR-240	Heat Sink
	5.	BMZ30P080FZK	Screw
	6.	BMZ30P060FZK	Screw
	7.	BMZ30P040FMC	Screw
	8.		Chassis
	9.	CDF-888	Connector
	10.	CDF-887	Connector
	11.	CDK-098	Cord
	12.	CDF-889	Connector
	13.		Plate
	14.	BMZ30P060FMC	Screw
	15.	CKS-267	Plug (2P)
★★	16.	TC9178F	IC (IC4)
★★	17.	TC9179F	IC (IC6)
★★	18.	HSH-156	Switch (LEVEL)
	19.	CKS-271	Plug (6P)
	20.	CKS-268	Plug (3P)
	21.	CKS-273	Plug (8P)
	22.	HKS-197	Connector (8P)
	23.	CWX-559	Signal Processor Unit
	24.	CDF-890	Connector
	25.	BMZ30P080FMC	Screw
	26.		Bracket
	27.		Bracket
	28.		Bracket
	29.	CNM-030	Spacer
★★	30.	NJM78M05A	IC (IC1)
	31.	CNM-783	Bush
	32.	BMZ30P060FMC	Screw
★★	33.	NJM78M12A	IC (IC9)
★★	34.	NJM79M12A	IC (IC10)
★★	35.	2SC2654	Transistor (Q152)
	36.	CKS-269	Plug (4P)
	37.	CKS-272	Plug (7P)
	38.	CDF-795	Connector (6P)
	39.	CBA-124	Screw, M3 x 5
★★	40.	2SC1847	Transistor
★★	41.	2SA886	Transistor
	42.		Bracket
★★	43.	μPC494C	IC (IC50)
	44.		Cushion
	45.	VACANT	
	46.	CCL-133	Feed through Capacitor
	47.	CWX-560	Servo Unit
	48.		Shield
	49.		Spacer
	50.		Bracket
	51.	BBN30P080FZK	Screw

- Hideaway Unit Section

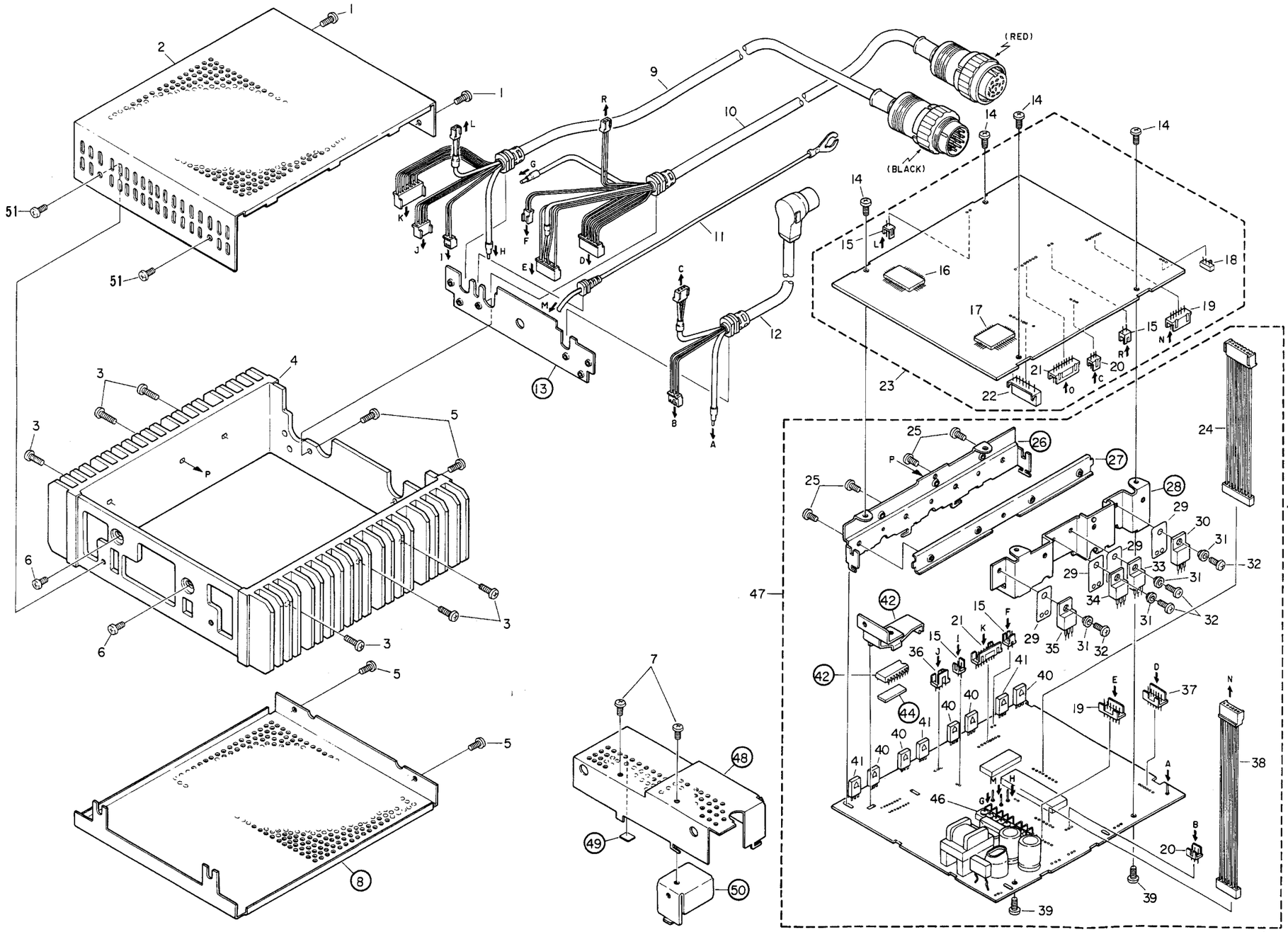


Fig. 71

10.3 MECHANISM ASSY

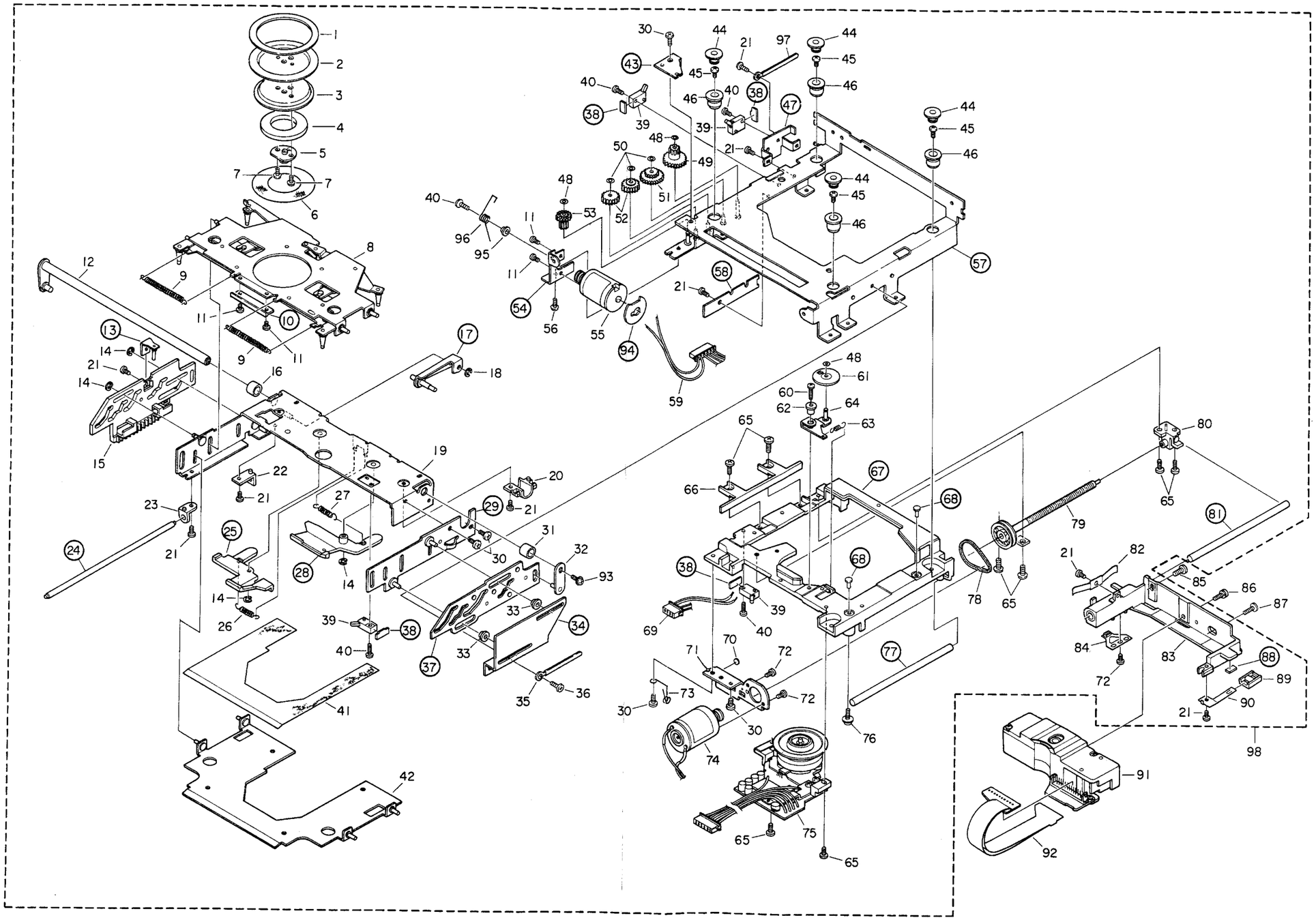


Fig. 72

• Parts List

NOTE:

- *For your parts Stock Control, the fast moving items are indicated with the marks ★ ★ and ★.*
  ★ ★: GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	CNN-279	Spacer		46.	CNW-926	Bush
	2.	CNG-596	Holder		47.		Bracket
	3.	CNG-597	Holder		48.	HBF-145	Washer
	4.	CNR-224	Magnet		49.	CNW-917	Gear
	5.	CNW-924	Clamper		50.	CBF-139	Washer
	6.	CNN-280	Felt		51.	CNW-918	Gear
	7.	BMZ20P040FMC	Screw		52.	CNW-920	Gear
	8.	CXD-367	Plate Unit		53.	CNW-919	Gear
	9.	CBH-824	Spring		54.		Bracket
	10.		Stopper	★★	55.	CXD-696	Motor Unit (LOADING)
	11.	HBA-173	Screw, M2 x 2		56.	CBA-097	Screw, M2.3 x 4
	12.	CXD-363	Arm Unit		57.		Chassis Unit
	13.		Lever Unit		58.		P.C. Board
	14.	YE15FUC	E-ring		59.	CDF-897	Connector
	15.	CNW-916	Lever		60.	BMZ20P080FMC	Screw
	16.	CLB-587	Collar		61.	CNW-909	Pulley
	17.		Arm Unit		62.	CLB-670	Collar
	18.	YE20FUC	E-ring		63.	CBH-823	Spring
	19.	CXD-360	Plate Unit		64.	CXD-374	Arm Unit
	20.	CNY-032	Holder		65.	BMZ26P060FMC	Screw
	21.	BMZ20P030FMC	Screw		66.	CNW-914	Spacer
	22.	CNW-912	Bearing		67.		Chassis
	23.	CNW-913	Bearing		68.		Rivet
	24.		Shaft		69.	CDF-899	Connector
	25.		Arm		70.	CNN-277	Spacer
	26.	CBH-862	Spring		71.	CXD-773	Bracket Unit
	27.	CBH-825	Spring		72.	BMZ20P025FMC	Screw
	28.		Arm		73.	CBH-882	Spring
	29.		Lever Unit	★★	74.	CXM-203	Motor (CARRIAGE)
	30.	BMZ26P040FMC	Screw	★★	75.	CXM-405	Motor (SPINDLE)
	31.	CLB-666	Collar		76.	iMZ26P060FMC	Screw
	32.	CXD-364	Arm Unit		77.		Shaft
	33.	CLB-586	Roller	★★	78.	CNT-110	Belt
	34.		Bracket		79.	CXD-373	Pulley Unit
	35.	HEF-102	Clamper		80.	CNW-911	Bearing
	36.	BMZ26P030FMC	Screw		81.		Shaft
	37.		Lever		82.	CBL-227	Spring
	38.		P.C. Board		83.	CNR-223	Housing
★★	39.	CSN-094	Switch		84.	CNW-925	Rack
	40.	CBA-172	Screw, M1.7 x 5.5		85.	BMZ30P040FMC	Screw
	41.	CNN-276	Sheet		86.	PMA30P050FMC	Screw
	42.	CXD-366	Tray Unit		87.	CBA-171	Screw, M3 x 4
	43.		Holder		88.		Spacer
	44.	CLB-584	Collar		89.	CNW-915	Spacer
	45.	CBA-182	Screw, M2.6 x 5		90.	CBL-228	Spring

Mark	No.	Part No.	Description
	91.	CGM-001	Pickup
	92.	CNL-665	P.C. Board
	93.	iMZ20P040FMC	Screw
	94.		P.C. Board
	95.	CLB-744	Collar
	96.	CBH-883	Spring
	97.	CEF-008	Clamper
	98.	CXD-375	Mechanism Unit

11. ELECTRICAL PARTS LIST

NOTE:
When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω 56 × 10^1 561 ..... RD1/4PS 5 6 1 J
47kΩ 47 × 10^3 473 ..... RD1/4PS 4 7 3 J
0.5Ω 0R5 ..... RN2H 0 R 5 K
1Ω 010 ..... RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ 562 × 10^1 ..... RN1/4SR 5 6 2 1 F

- *For your parts Stock Control, the fast moving items are indicated with the marks ★ ★ and ★.*
  ★ ★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*

Main Unit (CWX-561)

MISCELLANEOUS

Mark	Symbol & Description	Part No.
★★	IC1	TC40H004F
★★	IC2	NJM4558M
★★	IC3	KHA303
★★	IC4	KHA304
★★	IC5	NJM2904D
★★	IC6	PD6029
★★	IC7	M54546L
★★	IC8	TC4001BF
★★	IC9	NJM2903M
★★	IC101	TC4066BP
★★	IC102 – IC104	TA75558P
★★	Q1 – Q9, Q11 – Q13, Q101, Q102, Q105, Q107, Q108 Chip Transistor	2SC2712-LG or 2SC2712-LY
★★	Q10, Q104 Chip Transistor	2SA1162-SG or 2SA1162-SY
★★	Q14, Q21 – Q26, Q203 Chip Transistor	UN2211
★★	Q15	2SD1226M
★★	Q103, Q106 Chip Transistor	UN2111
★★	Q201	2SC1847
★★	Q202	2SA683
★	D1, D202, D205 Chip Diode	MA3075
★	D2, D3, D5 – D8, D101, D102 Chip Diode	MA151A
★	D9 Chip Diode	MA153
★	D10 Chip Diode	MA151WK
★	D103, D104	MTZ6R2
★	D201, D203	SIB01-02
	L201 Coil, 0.37mH	CTF-235
	L202 Ferri-Inductor, 15μH	CTF-078
	L203 Transformer	CTX-073
★★	VR1, VR2 Semi-fixed, 2.2kΩ (B)	CCP-374
★★	VR3 Semi-fixed, 47kΩ (B)	CCP-443
★★	VR4 Semi-fixed, 10kΩ (B)	CCP-439
★★	VR101, VR105 Semi-fixed, 4.7kΩ (B)	CCP-347
★★	VR102 Semi-fixed, 330kΩ (B)	CCP-358
★★	VR103 Semi-fixed, 4.7kΩ (B)	CCP-347
★★	VR104 Semi-fixed, 10kΩ (B)	CCP-349
★	TH1	CCX-010

Mark	Symbol & Description	Part No.
	X1 Ceramic Oscillator (4MHz)	CSS-030
	X2 Buzzer	CPV-031
★	ZNR201	ERZ-M10DK220

RESISTORS

Mark	Symbol & Description	Part No.
	R1 – R54, R57, R58, R61 – R68, R71 – R87, R89 – R91, R101, R102, R105 – R130, R133 – R141, R201, R202, R204 – R209 Chip Resistor	RS1/8S □□□J
	R55, R56, R69	RN1/2P □□□JL
	R70	RS1P □□□JL
	R103, R104	RD1/6PS □□□J

CAPACITORS

Mark	Symbol & Description	Part No.
	C1, C7, C9 – C11, C13, C20, C24, C27 Chip Capacitor	CKSYF473Z50
	C2, C45, C46, C75	CEA220M16LS
	C3, C29, C30 Chip Capacitor	CKSYF224Z25
	C4, C5, C12, C17 Chip Capacitor	CKSYB473K25
	C6, C25, C121 Chip Capacitor	CCSCH220J50
	C8, C21, C26, C74	CEA010M50LS
	C14, C22, C23, C72, C73 Chip Capacitor	CCSCH101J50
	C15, C16, C77 Chip Capacitor	CCSSL332J50
	C18	CEAR47M50LS
	C28, C41, C42, C44, C47, C71, C76 C78 Chip Capacitor	CKSYF473Z50
	C43	CEA470M16LS
	C48, C201, C205	CCG-081
	C79	CKDYF473Z25L
	C80	CQMA222J50L
	C101, C102 Chip Capacitor	CEA470M16LS
	C103 Chip Capacitor	CCSSL222J50
	C104, C105, C113, C114, C119, C120 Chip Capacitor	CKSYF473Z50
	C106	CQMA104J50L
	C107, C123 Chip Capacitor	CCSCH330J50
	C108, C109 Chip Capacitor	CKSYF224Z25
	C110	CQMA823J50L
	C111 Chip Capacitor	CCSSL122J50
	C112 Chip Capacitor	CCSSL332J50
	C115	CEA3R3M50LS
	C116 Chip Capacitor	CCSCH152J50
	C117	CQMA103J50L
	C118 Chip Capacitor	CCSCH271J50
	C122 Chip Capacitor	CCSCH220J50
	C202, C206, C208, C214 – C216 Chip Capacitor	CKSYF473Z50
	C203, C207	CEA471M16L2
	C204	CEA100M16LL
	C209	CEA101M16LL
	C210	CSYA1R5M250S
	C211	CEA330M35L2
	C212 Chip Capacitor	CKSYF224Z50
	C213	CEA330M25L2

Display Unit (CWX-563)

MISCELLANEOUS

Mark	Symbol & Description	Part No.
★★	IC301	PD7005
★	D301 – D310 LED	BG5724K
★★	S1 – S9 Switch	CSG-212
★	Display	CP2131GLR

RESISTORS

Mark	Symbol & Description	Part No.
	R301 – R314 Chip Resistor	RS1/8S □□□J
	R315, R316	RD1/2PS □□□JL or RS1/2P □□□JL
	R317	RD1/2PS □□□JL or RS1/2P □□□JL
	R318, R319	RD1/2PS □□□JL or RS1/2P □□□JL

CHIP CAPACITORS

Mark	Symbol & Descriptions	Part No.
	C301	CKSYF473Z50
	C302	CCSCH101J50

Servo Unit (CWX-560)

MISCELLANEOUS

Mark	Symbol & Description		Part No.
★★	IC1, IC11		NJM78M05A
★★	IC2		PD3023A
★★	IC3		PD8010
★★	IC4		NJM2903S
★★	IC5, IC7, IC8		TA75558S
★★	IC6		TC4066BP
★★	IC9		NJM78M12A
★★	IC10		NJM79M12A
★★	IC12		NJM79L05A
★★	IC50		μPC494C
★★	C1	Chip Transistor	UN2211
★★	Q2	Chip Transistor	UN2111
★★	Q3, Q6 – Q9, Q13 – R22, Q25, Q26, Q28, C29		DTC124ES
★★	Q4, Q12		2SA683
★★	Q5, Q31		2SC2458
★★	Q10		2SA1048
★★	Q23, Q24, Q27, Q30, Q151		DTA124ES
★★	Q32, Q34, Q36, Q38		2SC1847
★★	Q33, Q35, Q37, Q39		2SA886
★★	Q40		2SA798
★★	Q152		2SC2654
★	D1		VACANT
★	D2, D4, D151	Chip Diode	MA151K
★	D5, D7	Chip Diode	MA151WK
★	D152 – D155		11DQ05FC
★	ZD1	Chip Diode	MA3056
★	ZD2		RD20EB1 or RD20EB2 or MTZ20A or MTZ20B
★	Z151		RD39EC1 or RD39EC2
	L1	Coil, 5.6 μH	CTF-234
	L2, L3	Coil, 100 μH	CTF-232
	L4, L5	Coil	CTF-233
	T1	Transformer	CTH-085
	T2	Transformer	CTH-086
	T3	Transformer	CTH-084
★	TH1	Posistor	CCX-017
	X1	Ceramic Oscillator (4 MHz)	CSS-030

RESISTORS

Mark	Symbol & Description		Part No.
	R1 – R54, R56 – R100, R151 – R163, R165, R166, R168, R170	Chip Resistor	RS1/8S □□□J
	R164		RD1/4PM □□□J
	R167		RD1/4VM □□□J
	R169	0.1Ω (2W)	CCN-135

CAPACITORS

Mark	Symbol & Description		Part No.
	C1, C2		CEA100M25LS
	C2, C4, C5, C33 – C40		CEA010M50LS2
	C6, C7	Chip Capacitor	CCSSL101J50
	C8		CEA471M10L2
	C9 – C11, C13 – C15, C19, C20, C23, C41	Chip Capacitor	CKSYF103Z50
	C16, C17		CEA470M16LS
	C18		CQMA104J50L
	C22, C26	Chip Capacitor	CCSSL151J50
	C24, C27	Chip Capacitor	CKSYF224Z50
	C28		CEA101M16L2
	C29, C30	Chip Capacitor	CKSYF103Z50
	C31, C32		CEA470M25L2
	C42, C43	Chip Capacitor	CKSYB392K50
	C44		CKDYB102K50
	C72		CCG-104
	C151, C154	Chip Capacitor	CKSYF473Z50
	C152, C153, C165, C166, C171, C172		CSYA1R5M250S
	C155		CEAUH471M25
	C156		CEA100M25LS
	C157		CQMA103J50L
	C158		CQSAH102J50
	C159, C161 – C164		CEAUH101M25
	C160		CEAUH331M50
	C167 – C170		CEAUH101M16
	C1000	Feed through Capacitor	CCL-133

Signal Processor Unit (CWX-559)

MISCELLANEOUS

Mark	Symbol & Description		Part No.
★★	IC1		KHA301
★★	IC2, IC7		NJM4558DD
★★	IC3		TD6315AP
★★	IC4		TC9178F
★★	IC5		HM6116ASP-20
★★	IC6		TC9179F
★★	IC8		TC4027BP
★★	IC9		TC4001BP
★★	IC10		NJM78L08A
★★	IC11		NJM79L09A
★★	IC12		TD6705AP
★★	IC13		NJM072S
★★	IC14, IC15	Filter	CWW-225
★★	IC16, IC17		TA75558S
★★	Q1 – Q3, Q5 – Q8		2SC2458
★★	Q4, Q9		2SA1048
★	D1, D3, D4, D6, D7	Chip Diode	MA151A
★	D2	Chip Diode	MA153
★	D5	Chip Diode	MA151WA
★	D8		KV1226Y
	L1, L2	Coil, 470 μH	CTH-063
	L3	Coil	CTA-070
	F1	SAW Resonator	F1383K
	X1	X'tal (8.4672 MHz)	CSS-040
★★	VR1, VR2	Semi-fixed, 10kΩ (B)	CCP-349
★★	S1	Switch (LEVEL)	HSH-156

RESISTORS

Mark	Symbol & Description	Part No.
	R1 – R44, R51 – R78, R87 – R94 Chip Resistor	RS1/8S □□□J
	R79 – R86	RN1/4PQ □□□F

CAPACITORS

Mark	Symbol & Description		Part No.
	C1, C2, C58, C66		CEA010M50LS2
	C3, C4, C14, C27		CEA100M25LS
	C5		CEA470M25L2
	C6, C21, C59, C65		CEA470M16LS
	C7, C8, C11, C15 – C18, C22, C23, C26	Chip Capacitor	CKSYF103Z50
	C9		CQMA822K50L
	C10	Chip Capacitor	CCSCH151J50
	C12	Chip Capacitor	CCSCH331J50
	C13	Chip Capacitor	CCSCH221J50
	C19		QMA103J50L
	C20	Chip Capacitor	CCSSL681J50
	C24, C25, C69, C70	Chip Capacitor	CCSCH150J50
	C28 – C30, C36, C51, C52, C56, C62, C67, C68	Chip Capacitor	CKSYF103Z50
	C31, C33, C35	Chip Capacitor	CKSYB332K50
	C32, C34	Chip Capacitor	CKSYB103K50
	C53	Chip Capacitor	CCSSL470J50
	C54, C55	Chip Capacitor	CCSSL050C50
	C57	Chip Capacitor	CKSYB102K50
	C60, C63		CQSAH102J50
	C61, C64		CCDSL150J50
	C71 – C74, C77 – C79	Chip Capacitor	CKSYF103Z50
	C75, C76		CQMA153J50L
	C80, C81		CEA330M16L2

Miscellaneous Parts List

Mark	Symbol & Description		Part No.
		Pickup	CGM-001
★★	M1	SPINDLE Motor	CXM-405
★★	M2	CARRIAGE Motor	CXM-203
★★	M3	Motor Unit (LOADING)	CXD-696
★★	S10 – S13	Switch (FRONT, HOME, INTER LOCK, DISC DETECT)	CSN-094

12. PACKING METHOD

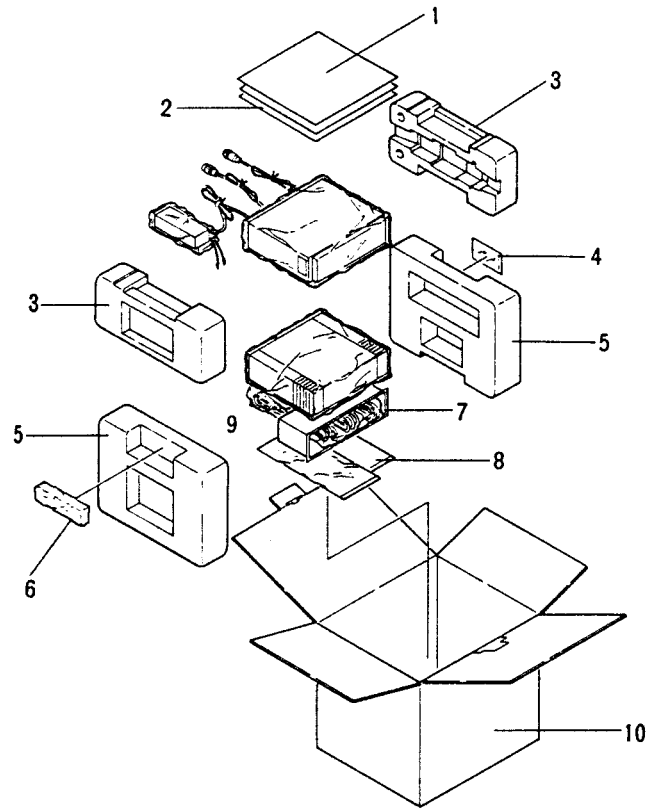


Fig. 73

● Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	CRD-547	Owner's Manual		8.		Panel Assy
			(English, French, German,		8-1.	CNB-793	Panel
			Spanish)		8-2.	CNW-757	Holder
	2.	CRD-548	Owner's Manual		9.	CEA-885	Accessory kit
			(Swedish, Norwegian, Dutch,		9-1.	CDE-437	Cord
			Italian)		9.2	CNF-111	Strap
	3.	CHF-045	Styrofoam		9-3.	CNF-382	Lever
	4.	CEA-225	Screw Assy		9-4.	CNW-642	Holder
	4-1.	B10-819-A	Screw, M3 x 4		9-5.		Screw kit
	4-2.	B20-004	Washer, 4φ		9-5-1.	CBA-028	Screw for Strap
	4-3.	B20-223-F	Pin, 3 x 30		9-5-2.	NF40FMC	Nut
	4-4.	B30-174-A	Screw, M5 x 16		9-5-3.	NF50FMC	Nut
	5.	CHD-960	Styrofoam		9-5-4.	PMB50Y160FMC	Screw
	6.		Bracket Assy		9-5-5.	WS40FMC	Washer
	6-1.	CNE-510	Bracket		10.	CHF-043	Carton
	6-2.	CNM-667	Fastener				
	7.	CNG-223	Holder				